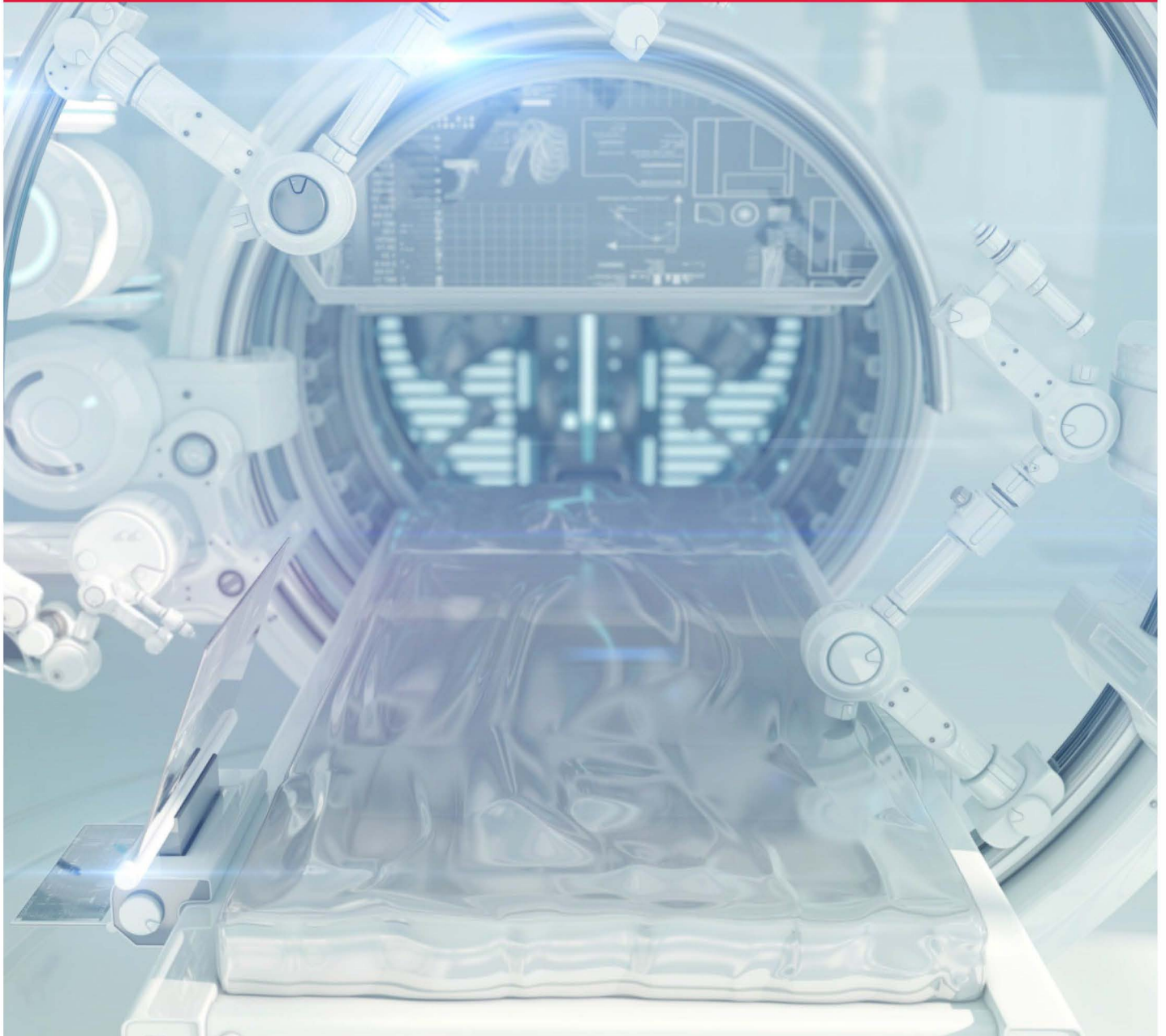


# Quantum Devices

Encoder Innovations



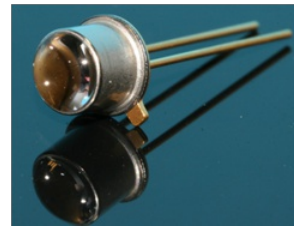
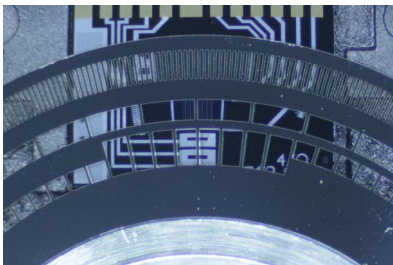
# Better Design, Better Performance...

## Sensor

The effective sensing area of the A/B incremental channels on the Quantum Devices encoder is larger than most Competitor's ASIC designs. Moreover, the larger A/B array and larger A/B disc tracks yield well over two times the allowable disc runout (TIR) in the Quantum Devices design – that is, the radial distance the disc can travel before it is not aligned with the photodiode.

The Quantum Devices sensor also has an larger commutation sensing area, produced by the combination of diodes and tracks size. The Quantum Devices commutation channels are created by three large tracks allowing or obstructing the light from view by the commutation photodiodes. This is in contrast to the very small commutation disc openings on Competitor's Encoders.

Overall, the larger effective sensing areas across all three channels (incremental, index and commutation) allows for an increased immunity to contamination as well as larger analog signals; this translates to a better signal to noise ratio. The significantly greater allowance for runout across all three channels affords greater flexibility in overall product design.



## Light Source

The light source used in all Quantum Devices Encoders is a Light Emitting Diode (LED). The Quantum Devices LED is hermetically sealed with a TO-46 high reliability welded metal package and a glass lens. The metal can acts as a heat sink for the LED, the glass lens provides a consistent and reliable collimation of light, and the welded package ensures the LED is protected in a controlled environment.



## QM35

Features: 38mm Diameter, Up to 1MHz Frequency Response, Low Profile 11mm Assembled Height, High Noise Immunity, -30 to 115°C, **Full Complement Output**, RoHS

Part Number: M - Resolution - Commutation - Output - Cover - Bore - Mounting - Index - Hardware

Resolution: 360, 500, 512, 1000, 1024, 2000, 2048, 2500, 4000, 4096, 5000, 5120, 8000, 8192	Commutation: 0 = No Comm 4 = 4 Pole 6 = 6 Pole 8 = 8 Pole 10 = 10 Pole	Output: A = Line Driver B = Line Driver (ABZ) / Open Collector (UVW) C = Dual Voltage Line Driver (ABZ) / Open Collector (UVW)	Cover: A = Hole in Cover B = Closed Cover (shaft < .512") C = Closed Cover (shaft < .450")	Bore: C = 5mm D = 6mm E = 8mm K = .1875" L = .250" M = .3125" N = .375"	Mounting: A = 1.280" B = 1.812"	Index: A = 90° A & B High B = 90° A & B Low	Hardware: See Specification Sheet for Selection
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## QML35

Features: 38mm Diameter, Up to 1MHz Frequency Response, Low Profile 11mm Assembled Height, High Noise Immunity, -30 to 115°C, **Single Ended Output**, RoHS

Part Number: L - Resolution - Commutation - Voltage - Cover - Bore - Mounting - Index - Hardware

Resolution: 360, 500, 512, 1000, 1024, 2000, 2048, 2500, 4000, 4096, 5000, 5120, 8000, 8192	Commutation: 0 = No Comm 4 = 4 Pole 6 = 6 Pole 8 = 8 Pole 10 = 10 Pole	Voltage: A = 5V (+/- 5%) B = 3.3V (+/- 5%)	Cover: A = Hole in Cover B = Closed Cover (shaft < .512") C = Closed Cover (shaft < .450")	Bore: C = 5mm D = 6mm E = 8mm K = .1875" L = .250" M = .3125" N = .375"	Mounting: A = 1.280" B = 1.812"	Index: A = 90° A & B High B = 90° A & B Low	Hardware: See Specification Sheet for Selection
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## QM35 EZ-COMM

Features: **Push Button Commutation Programming**, 38mm Diameter, Up to 1MHz Frequency Response, Low Profile 11mm Assembled Height, High Noise Immunity, -30 to 115°C, Full Complement Output, RoHS

Part Number: M - Resolution - Commutation - Output - Cover - Bore - Mounting - Index - Hardware

Resolution and Commutation Combinations 4 Pole 500, 512, 1000, 1024, 2000, 2048, 2500 6 Pole 500, 512, 1000, 1024, 2000, 2048, 2500, 4000, 4096 8 Pole 500, 512, 1000, 1024, 2000, 2048, 2500, 4000, 4096, 5000 10 Pole 500, 512, 1000, 1024, 2000, 2048, 2500, 4000, 4096, 5000 14 Pole 2048	Output: D = RS422 (ABZ) and (UVW) with EZ-COMM E = RS422 (ABZ) Open Collector (UVW) with EZ-COMM	Cover: A = Hole in Cover B = Closed Cover (shaft < .512") C = Closed Cover (shaft < .450")	Bore: C = 5mm D = 6mm E = 8mm K = .1875" L = .250" M = .3125" N = .375"	Mounting: A = 1.280" B = 1.812"	Index: A = 90° A & B High B = 90° A & B Low	Hardware: See Specification Sheet for Selection
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## QM22

Features: 26mm Diameter, 500 KHz Frequency Response, Low Profile 12mm Assembled Height, High Noise Immunity, -30 to 115°C, Full Complement Output (ABZ), RoHS

Part Number: M2 - Resolution - Commutation - Output - Cover - Bore - Mounting - Hardware

Resolution: A1 = 250 B1 = 256 A2 = 500 B2 = 512 A4 = 1000 B4 = 1024 A6 = 2000 B6 = 2048 A7 = 2500	Commutation: A = No Comm B = 4 Pole C = 6 Pole D = 8 Pole	Output: A = Line Driver (ABZ only) B = Line Driver (ABZ) / Open Collector (UVW) C = Line Driver (ABZ) / Open Collector with pull-ups (UVW)	Cover: A = Hole in Cover	Bore: C = 2mm D = 2.5mm E = 3mm F = 4mm M = .125" N = .15625"	Mounting: A = 1.024"	Hardware: See Specification Sheet for Selection
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## QR12

Features: 1.2" Diameter, Integral Bearings, 500kHz Frequency Response, .99" Assembled Height, High Noise Immunity, 5VDC, -20 to 115°C, RoHS, Optional Sine/Cosine Output

Part Number: QR12 - Resolution - Commutation - Output - Housing - Bore - Mounting - Index

<b>Resolution:</b> 24*, 256, 360, 500, 512, 1000, 1024, 1250, 2000, 2048, 2500, 4000, 4096, 5000, 8000, 8192, 10000, 16000, 16384, 20000	<b>Commutation:</b> 0 = No Comm 4 = 4 Pole 6 = 6 Pole 8 = 8 Pole	<b>Output:</b> A = Line Driver B = Line Driver (ABZ) / Open Collector (UVW) C = Sin/Cos / Line Driver (UVW)* D = Sin/Cos / Open Collector (UVW)*	<b>Housing:</b> B = Through Hole Cover C = Closed Cover	<b>Bore:</b> A = 3mm    B = 4mm C = 5mm    D = 6mm E = 8mm    F = 10mm G = 7mm    J = .125" K = .1875"    L = .250" M = .3125"    N = .375"	<b>Mounting:</b> A = 1.812" B = 1.575" C = 1.280"	<b>Index:</b> A = 90° gated to A & B C = Ungated Square Wave (Sin/Cos Option Only) D = Ungated Sinusoidal (Sin/Cos Option Only)
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\*Sin/Cos Limited to 500 - 1250 PPR

\*\*No Commutation option available for 24 ppr



## LP12

Features: 1.2" Diameter, Integral Bearings, 500kHz Frequency Response, .816" Assembled Height, High Noise Immunity, 5VDC, -20 to 115°C, RoHS, Optional Sine/Cosine Output

Part Number: LP12 - Resolution - Commutation - Output - Housing - Bore - Mounting - Index

<b>Resolution:</b> 24*, 256, 360, 500, 512, 1000, 1024, 1250, 2000, 2048, 2500, 4000, 4096, 5000, 8000, 8192, 10000, 16000, 16384, 20000	<b>Commutation:</b> 0 = No Comm 4 = 4 Pole 6 = 6 Pole 8 = 8 Pole	<b>Output:</b> A = Line Driver B = Line Driver (ABZ) / Open Collector (UVW) C = Sin/Cos / Line Driver (UVW)* D = Sin/Cos / Open Collector (UVW)*	<b>Housing:</b> B = Through Hole Cover C = Closed Cover	<b>Bore:</b> A = 3mm    B = 4mm C = 5mm    D = 6mm E = 8mm    F = 10mm K = .1875"    L = .250" M = .3125"	<b>Mounting:</b> A = 1.812" B = 1.575" C = 1.280"	<b>Index:</b> A = 90° gated to A & B C = Ungated Square Wave (Sin/Cos Option Only) D = Ungated Sinusoidal (Sin/Cos Option Only)
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\*Sin/Cos Limited to 500 - 1250 PPR

\*\*No Commutation option available for 24 ppr



## HR12

Features: HEDs Compatible Mounting, Integral Bearings, 500kHz Frequency Response, High Noise Immunity, 5VDC, -20 to 115°C, RoHS

Part Number: HR12 - Resolution - Commutation - Output - Housing - Bore - Mounting - Index

<b>Resolution:</b> 24*, 256, 360, 500, 512, 1000, 1024, 1250, 2000, 2048, 2500, 4000, 4096, 5000, 8000, 8192, 10000, 16000, 16384, 20000	<b>Commutation:</b> 0 = No Comm 4 = 4 Pole 6 = 6 Pole 8 = 8 Pole	<b>Output:</b> A = Line Driver B = Line Driver (ABZ) / Open Collector (UVW)	<b>Housing:</b> H = HEDS Compatible	<b>Bore:</b> A = 3mm    B = 4mm C = 5mm    D = 6mm E = 8mm    F = 10mm G = 7mm    J = .125" K = .1875"    L = .250" M = .3125"    N = .375"	<b>Mounting:</b> H = HEDS	<b>Index:</b> A = 90° gated to A & B
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\*\*No Commutation option available for 24 ppr

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## QR145



Features: 1.45" Diameter, Integral Bearings, 500kHz Frequency Response, .87" Assembled Height, High Noise Immunity, -20 to 100°C with optional 120°C, RoHS

Part Number: QR145 - Voltage - Resolution - Commutation - Output - Bore - Mounting - Index

<b>Voltage:</b> 05/05 = 5VDC 05/26 = 5-26VDC	<b>Resolution:</b> 120, 200, 250, 256, 360, 500, 512, 600, 635, 800, 1000, 1024, 1250, 2000, 2048, 2500, 3000, 3600, 4096, 5000	<b>Commutation:</b> 0 = No Comm 4 = 4 Pole 6 = 6 Pole 8 = 8 Pole	<b>Output:</b> 01 = Line Driver 02 = 5-26VDC Line Driver 03 = TTL 04 = Line Driver (ABZ) / Open Collector (UVW)	<b>Bore:</b> T1 = .250" T2 = .3125" T3 = .375" T4 = 6mm T5 = 8mm T6 = 10mm T11 = 5mm T12 = 4mm T18 = .1875"	<b>Mounting:</b> 01 = 1.812" 02 = Size 15 Resolver 03 = IP66 Sealed Housing 04 = 1.575" 06 = Inverted 1.575" 07 = Inverted 1.812"	<b>Index:</b> 00 = Ungated 01 = 180° gated to A 02 = 90° gated to A & B
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## QR200



Features: 2" Diameter, Integral Bearings, 500kHz Frequency Response, .93" Assembled Height, High Noise Immunity, -20 to 100°C with optional 120°C, RoHS

Part Number: QR200 - Voltage - Resolution - Commutation - Output - Bore - Mounting - Index

<b>Voltage:</b> 05/05 = 5VDC 05/26 = 5-26VDC	<b>Resolution:</b> 500, 512, 1000, 1024, 2000, 2048, 2500, 4096, 5000, 8192, 10000	<b>Commutation:</b> 0 = No Comm 4 = 4 Pole 6 = 6 Pole 8 = 8 Pole	<b>Output:</b> 01 = Line Driver 02 = 5-26VDC Line Driver 03 = TTL 04 = Line Driver (ABZ) / Open Collector (UVW)	<b>Bore:</b> T3 = .375" T5 = 8mm T7 = .4375" T8 = .500" T9 = .625" T10 = 12mm T14 = 14mm	<b>Mounting:</b> 01 = 2.375" 02 = Size 21 Resolver 03 = 1.812"	<b>Index:</b> 00 = Ungated 01 = 180° gated to A 02 = 90° gated to A & B
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## QR787/QR110



Features: .787" Diameter, Integral Bearings, 200kHz Frequency Response, High Noise Immunity, 0 to 70°C with optional -20 to 100°C, RoHS

Part Number: QR787 or QR110 - Voltage - Resolution - Output - I/O Termination - Shaft Option

<b>Voltage:</b> 05/05 = 5VDC 05/26 = 5-26VDC	<b>Resolution:</b> 500, 512, 1000, 1024, 2000, 2048	<b>Output:</b> 01 = TTL 02 = Line Driver 03 = 5-26VDC Line Driver	<b>I/O Termination:</b> 01 = Straight Pins 02 = 8" Ribbin Cable w/ Connector	<b>Hollow Bore:</b> H1 = 2.5mm H2 = 2mm H3 = .125" H4 = 3mm H5 = 4mm  <b>Solid Shaft:</b> S1 = .125"
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## QDH20



Features: Size 20 and 25 Flange, 500kHz Frequency Response, High Noise Immunity, -20 to 100°C Operating Temperature, IP66 and 64, 5-26VDC

Part Number: QDH20 - Mounting - Housing - Shaft - N - Resolution - Output - Channels - Waveform

<b>Mounting:</b> M1 = Size 20 Flng w/ 1.181" F Pilot M2 = Size 20 Flng w/ 1.250" M Pilot M3 = Size 20 Servo w/ 1.181" F Pilot M4 = Size 20 Servo w/ 1.250" M Pilot M5 = Size 25 Flng w/ M Pilot M6 = Size 25 Servo w/ M Pilot F1 = Hollow Shaft 2.25" F Mount	<b>Housing:</b> C1 = Radial 10 Pin C5 = Axial 10 Pin C2 = Radial 7 Pin C6 = Axial 7 Pin C3 = Radial 6 Pin C7 = Axial 6 Pin C4 = Radial Wire Gland C8 = Axial Wire Gland	<b>Solid Shaft:</b> S2 = .375" S3 = 10mm S4 = .250"  <b>Hollow Bore:</b> H5 = .375" H6 = .500" H7 = .625"	<b>Resolution:</b> 120, 200, 250, 256, 360, 500, 512, 600, 635, 800, 1000, 1024, 1250, 2000, 2048, 2500, 3000, 3600, 4096, 5000	<b>Output:</b> 02 = Line Driver 04 = Open Collector	<b>Channels:</b> 01 = Single A 02 = Dual AB 03 = Dual AB w/ Z 04 = Single A w/ A' 05 = Dual AB w/ Comp. A'B' 06 = Full Comp. AA' BB' ZZ'	<b>Output Waveform:</b> 01 = LD Out, Z gated to B' 02 = OC Out, Ungated Z 03 = LD Out, Z gated to A 04 = OC Out, Ungated Z
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\*Consult factory for any options/requirements not listed



Quantum Devices has been manufacturing optical encoders for over 20 years and has its roots in the semiconductor industry. This background in photo optics forged the path toward the creation of the patented design for the heart of our encoders, an interlaced photo diode. We design and manufacture all of our own sensors in our Class 1000 cleanroom. In this same vein, we have intentionally become vertically integrated to control quality, cost and our supply chain. Injection molding, machining, PCB assembly and precision assembly are a few of the internal processes we do in Barneveld, WI USA. This gives us the advantage to react quickly to our customers' ever changing encoder demands.

Quantum Devices offers a full range of transmissive incremental encoders. Our encoders are used in industrial and commercial motion control, including medical equipment, industrial automation, and autonomous mobile robots (AMR).

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