

QML35 Optical Encoder

Design Features:

- Bearingless modular design
- Low profile assembled height
- Resolutions up to 8192 lines per revolution
- 4, 6, 8 or 10 pole commutation
- Easy Lock-n-Twist assembly feature
- Through shaft sizes up to 0.375" Diameter
- Up to 1Mhz Frequency Response
- High Noise Immunity
- RoHS Construction
- Hub to shaft uses two 3-48 set screws
- Hermetically sealed LED
- Multiple mounting options including resolver size 15



Recommended Connector:
BERG (FCI) P/N 90312-008 LF

Description:

Quantum Devices QML35 is a high performance, low profile modular design ideal for high volume OEM applications and priced competitively for all sizes of motion control projects. The QML35's versatile electrical configurations include lines counts up to 8192 and several commutation options. The QML35's patent pending lock-n-twist mechanism simplifies installation; saving production time and money. The QML35 is the newest solution to your motion control needs.

Ordering Information

Sample: L-1000-4-A-A-L-A-A-A

Model Prefix	- PPR -	Poles	- Voltage -	Cover	- Hub Size -	Mounting	- Index -	Hardware
L	360	0	A = 5v ± 5%	A = Hole in cover	C = 5mm	A = 1.280" BC	A = 90°, AB high	A = English
	500	4	B = 3.3v ± 5%	B = Closed cover	D = 6mm	B = 1.812" BC	B = 90°, AB low	B = Metric
	512	6		(Shaft < .512")	E = 8mm			C = No hardware
	1000	8		C = Closed cover	K = .1875"			D = English with pre-applied thread-lock to mounting screws.
	1024	10		(Shaft < .450")	L = .250"			E = Metric with pre-applied thread-lock to mounting screws.
	2000				N = .375"			Hardware packaged in bulk.
	2048							
	2500							
	4000							
	4096							
	5000							
	5120							
	8000							
	8192							

Note:

- 1.) 4 Poles has four states per revolution (2 pole pair), or two 360° electrical cycles per revolution.
- 2.) Mounting Option A allows for Resolver Size 15.
- 3.) Consult factory for configurations not shown.
- 4.) 360PPR not available with 6, 8 or 10 Poles.

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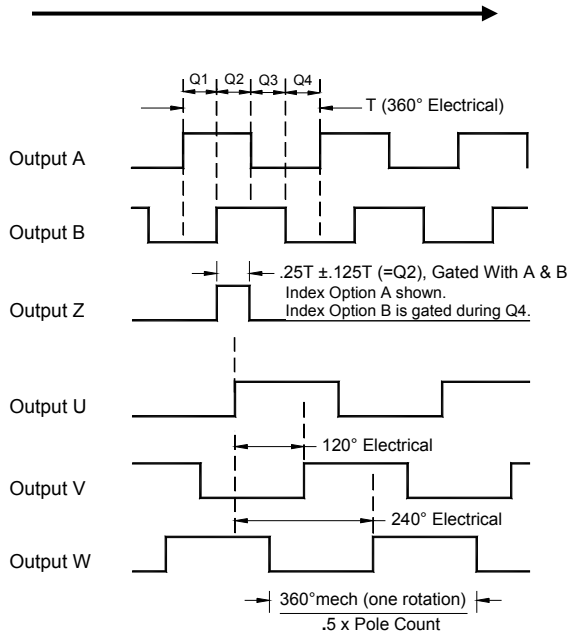
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Output Waveforms

CCW Shaft Rotation as Viewed Looking at Encoder Top.



$$Q1 + Q2 = 0.5T \pm 0.125T$$

$$Q2 + Q3 = 0.5T \pm 0.125T$$

$$Qn = 0.25T \pm 0.125T \quad (n = 1, 2, 3, 4)$$

Electrical Specifications

Input Voltage	5 VDC \pm 5% or 3.3v \pm 5%
Input Current Requirements	65mA Typ., 100mA Max Plus Interface Loads
Input Ripple	2% Peak to Peak @ 5 VDC
Output Circuits	TTL- Sink or Source 4ma max. Compatible with Renco PP option.
Incremental Output Format	Quadrature A leading B for CCW rotation viewed from encoder top.
Max Operating Frequency	<ul style="list-style-type: none"> < 5000PPR = 500Khz or 15,000RPM 5000PPR – 7999PPR = 675Khz \geq8000PPR = 1.0Mhz
Commutation Format	Three Phase 4, 6, 8 or 10 poles
Commutation Accuracy (U-V-W)	\pm 2° mechanical
Interpolation Factors	1000/1024PPR = 2x, 2000/2048PPR = 4x 2500PPR = 5x, 4000/4096PPR = 8x 5000/5120PPR = 10x, 8000/8192PPR = 16x

Environmental Specifications

Storage Temperature	-40 to 125° C
Operating Temperature	-30 to 115° C
IP Rating	40
Humidity	90% Non-Condensing
Vibration	20 g's @ 25 to 2,000 Hz
Shock	100 g's @ 6mS Duration

Mechanical Specification

Hub Minimum Diameter	Hub Size +0.0002"
Recommended Shaft Tolerance	-0.0005, + 0.0000"
Minimum Shaft Engagement	.400" [10.2mm]
Allowable Shaft Run Out	0.05mm, 0.002" TIR [+/- .0010" shaft radial play from initial shaft position of assembled encoder]
Allowable Axial Shaft Movement	\pm 0.25mm, \pm 0.010"
Mounting	1.28", 1.812" Bolt Circle, Resolver mount
Dynamic Commutation Adjustment Range	30° mechanical
Moment of Inertia	8.0×10^{-6} oz-in-S ²

Electrical Pin Functions:

Pin Number	Function
1	GND
2	Z
3	A
4	Vcc
5	B
6	U
7	V
8	W

U V and W are "no connect" for Pole option 0.

Hardware Options:

Option A - English:

- 2ea Hub set screw: SS 3-48 x 1/16" (.05" hex driver).
- 2ea Cover screw: Plastite 48-2, thread 2-28, length 1/4", Torx Plus IP7.
- For Mounting "A" 1.280 BC - 2ea Mounting Screw: 2-56x1/4" Button Head (.05"hex driver).
- For Mounting "B" 1.812 BC - 2ea Mounting Screw: 4-40x5/16" Button Head (.062"hex).

Option D – English: Components same as Option A hardware. Mounting screws have pre-applied threadlock.

Option B - Metric:

- 2ea Hub set screw: SS 3-48 x 1/16" (.05" hex driver).
- 2ea Cover screw: Plastite 48-2, thread 2-28, length 1/4", Torx Plus IP7.
- For Mounting "A" 1.280 BC - 2ea Mounting Screw: M2.5x6mm (Max head diameter=4.5mm), Button Head (1.5mm Hex).
- For Mounting "B" 1.812 BC - 2ea Mounting Screw: M2.5x8mm Button Head (1.5mm Hex).

Option E – Metric: Components same as Option B hardware. Mounting screws have pre-applied threadlock.

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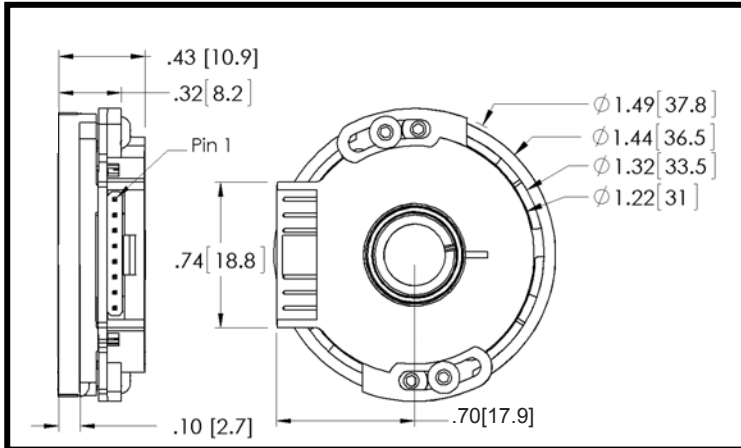
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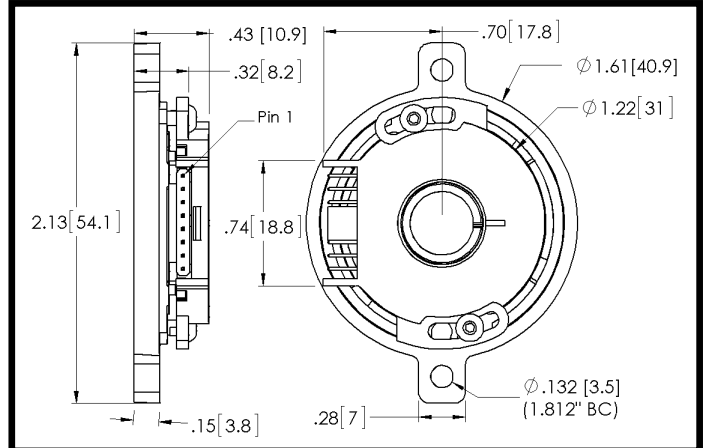
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Mechanical Dimensions

Model QML35 – 1.280" Bolt Circle (Mounting Option A)



Model QML35 – 1.812" Bolt Circle (Mounting Option B)

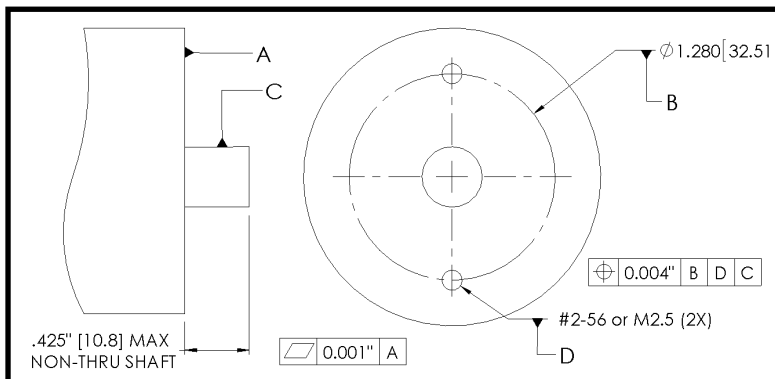


Note:

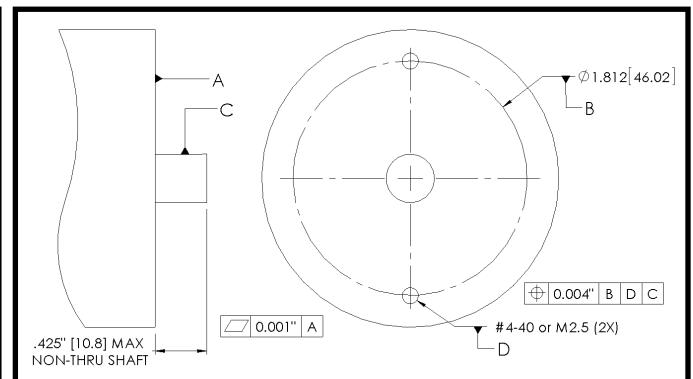
- Closed Cover Option B – Maximum shaft engagement up to .512" [13.0]. Overall height increases from .43 [10.9] to .57 [14.5]. This additional height has a cylinder diameter .56 [14.2], centered on the cover top.
- Closed Cover Option C – Maximum shaft engagement up to .450" [11.4]. Overall height increases from .43 [10.9] to .51 [13.0]. This additional height has a cylinder diameter .56 [14.2], centered on the cover top.

Mounting Requirements

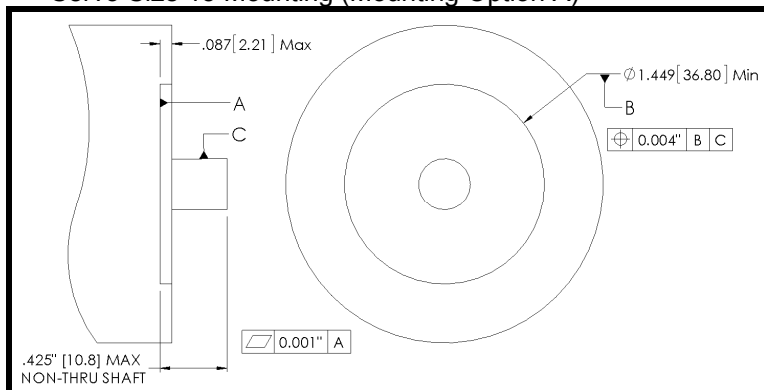
Mounting Option A (1.280" Bolt Circle)



Mounting Option B (1.812" Bolt Circle)



Servo Size 15 Mounting (Mounting Option A)



Patent Protection:

- Patent Pending
- US Patent 6,563,108

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ISO 9001

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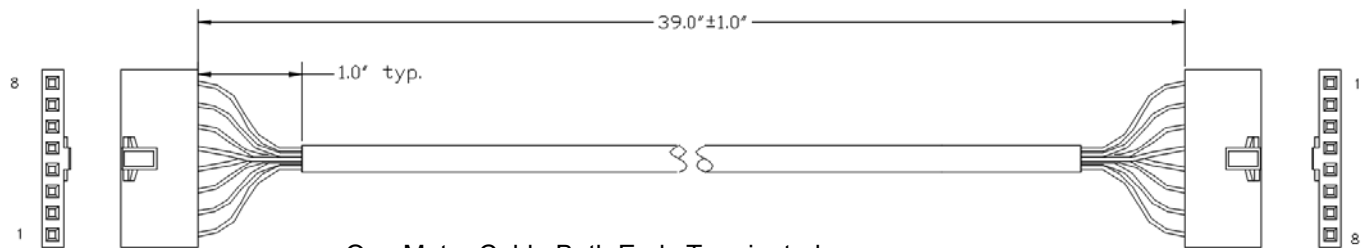
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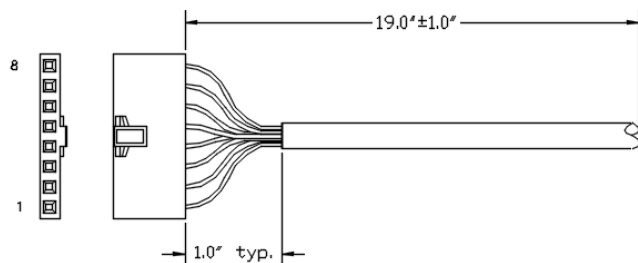
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CABLE ACCESORIES

(2161AG039, 2163AG039, 2162AG019, 2164AG019)
Consult Factory for Custom Lengths



One Meter Cable Both Ends Terminated:
2161AG039 = 8 Conductor 28awg for UVW Commutation
2163AG039 = 5 Conductor 28awg for Non-Commutation
Connector = BERG (FCI) P/N 90312-008 LF



Half Meter Cable One End Terminated:
2162AG019 = 8 Conductor 28awg for UVW Commutation
2164AG019 = 5 Conductor 28awg for Non-Commutation
Connector = BERG (FCI) P/N 90312-008 LF

Pin Number	Signal Function	2161AG039	2163AG039
		2162AG019	2164AG019
1	GND	Black	Black
2	Z	Orange	Orange
3	A	Yellow	Yellow
4	+Vcc	Red	Red
5	B	Blue	Blue
6	U	Green	---
7	V	Brown	---
8	W	White	---

Note:

1. Cable has internal foil shield with 28ga drain wire trimmed to jacket edge.
2. Unused wires to be locally isolated from adjacent signal wires, Vcc and Gnd to prevent damage to encoder signals.

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