

CM-2600 Series Brushless Hollow Shaft Servo Motor with Integrated Optical Encoder

Allied Motion's CM-2600 Series features a high performance brushless DC motor with 19 mm (0.748 in.) ID hollow shaft (incremental encoder versions) or 12.7 mm (0.500 in.) ID hollow shaft (absolute encoder versions). The motor is characterized by a very high torque-to-inertia ratio and develops up to 0.69 Nm (97 oz-in) of peak torque.

CM-2600 series motor-encoders were specifically designed for direct-drive, high resolution, high speed positioning applications. They feature a stainless-steel shaft and robust aluminum housing. Models are available with sine-cosine or digital incremental encoder, or an absolute 17-bit Gray code encoder.

Typical applications include optical instruments, scanners, gimbal actuation and other direct-drive applications where a gearbox is unsuitable or uneconomical.

For alternate motor configurations or application assistance, please contact an Allied Motion Solution Center

Features & Benefits

- High performance brushless DC torque motor with 0.189 Nm (26.8 oz-in) rated torque and 22 W rated power output
- CM-2600 model with ultra low distortion incremental sine/cosine encoder designed for use with most interpolators
- CM-2650 model with digital incremental encoder with up to 1,250,000 PPR (5 million quadrature measuring steps)
- CM-2650A model with 17-bit absolute Gray code encoder

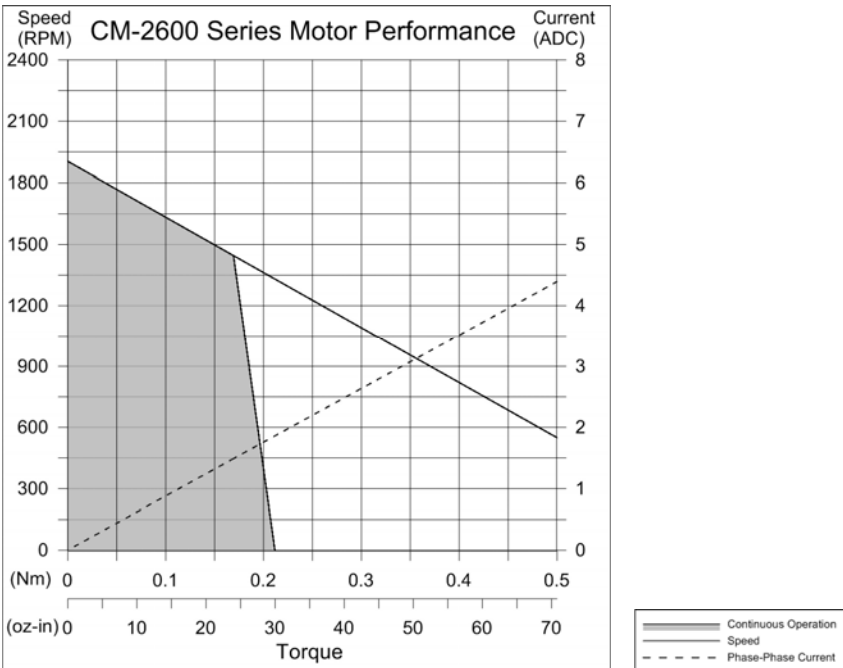
Options

- Alternate winding voltage
- Specialized encoder line counts and/or index
- Customized cable and/or connector
- RoHS compliancy available
- Extended temperature range: -40°C to +85°C



- Rated torque of 0.189 Nm (26.8 oz-in) at 1125 RPM
- Rated output power of 22 W @ 1125 RPM and 20 °C ambient
- Hollow through shaft up to 19 mm (0.748 in.)
- Incremental or absolute encoder formats: Up to 1.25 million pulses/rev or 17-bits

PERFORMANCE



Torque Motors

CM-2600 Series Brushless Hollow Shaft Servo Motor with Encoder

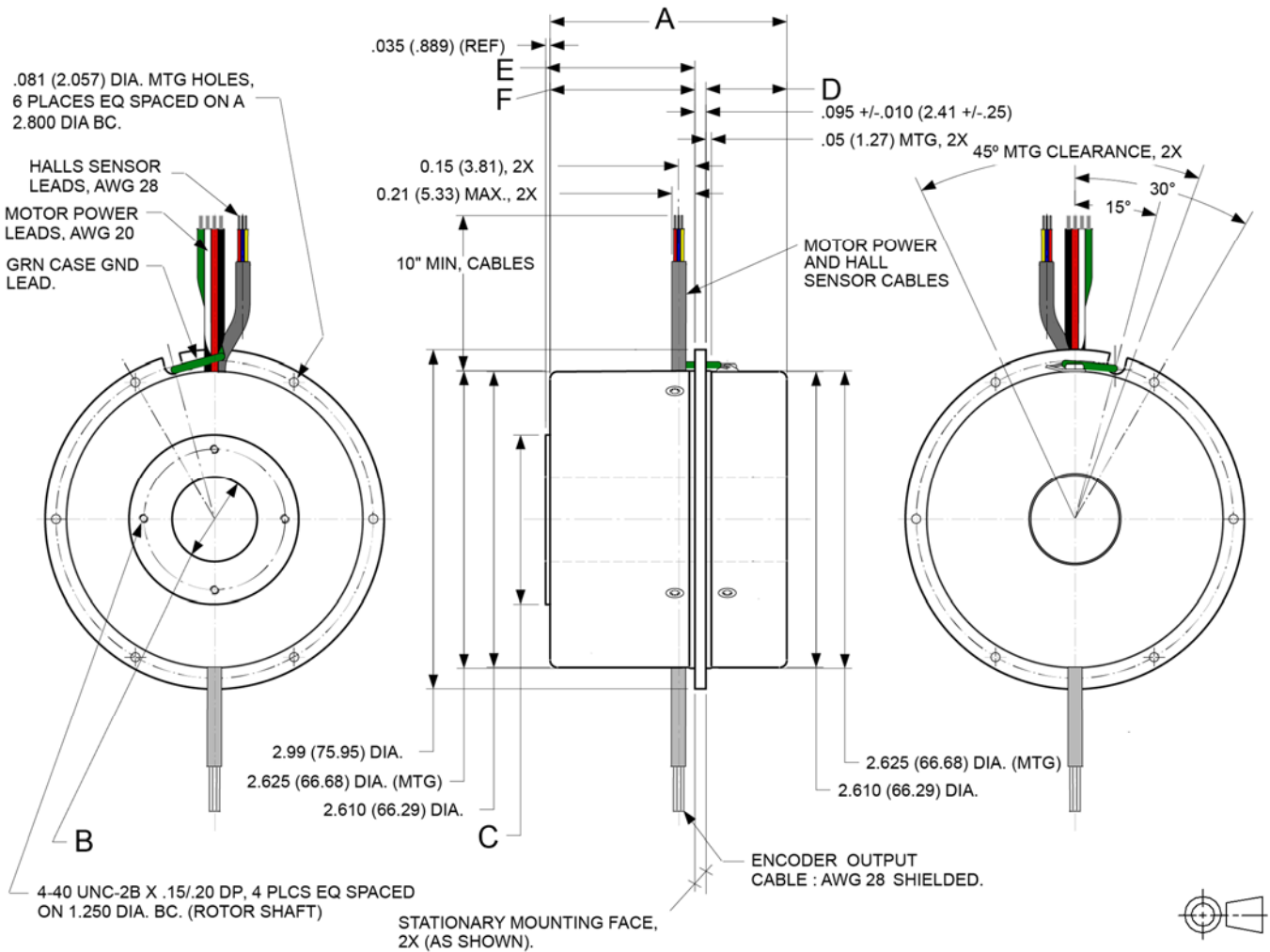
MOTOR SPECIFICATIONS

Parameter	Value
Winding Voltage	24 VDC
Rated Torque,* Nm (oz-in)	0.189 (26.8)
Rated Speed	1125 RPM
Rated Power,* @ 75 °C	22.3 W
Thermal Resistance *	3.7 °C/W
Continuous Stall Torque, Nm (oz-in) @ 20 °C ambient	0.212 (29.9)
Peak Torque, Nm (oz-in) ±15%	0.69 (97)
Peak Current, ±15%	6.1 A
No-Load Speed	1916 RPM
Cogging Torque, Nm (oz-in)	0.013 (1.9) max.
Torque sensitivity, Kt, Nm/A (oz-in/A), ±10%	0.11 (15.7)
Voltage constant, Kb, V-s/rad (V/kRPM), ±10%	0.11 (11.6)
Motor Constant, Km, Nm/√W (oz-in/√W)	0.056 (7.96)
Electrical Time Constant	0.36 ms
Mechanical Time Constant	3.9 ms
Terminal resistance, ±12%	3.89 Ω
Terminal inductance, ±30%	1.46 mH
Poles	12
Rotor Inertia, kg-m ² (oz-in-sec ²)	2.9E-5 (4.1E-3)
Shock / Vibration	50 g at 11 ms / 5 - 2000 Hz at 20 g
Bearings	ABEC-1
Shaft Loading, N, (lbf)	44.5 (10) axial; 22.2 (5) radial
Shaft T.I.R, mm (in)	0.0127 (0.0005)
Motor Weight, kg (oz)	0.51 (18)
Operating Temperature	-20 to +85 °C
Relative Humidity, non-condensing	98 %
Protection Rating	IP40

*Motor mounted to aluminum plate, 100 mm sq. by 6.4 mm thick (4 in. sq by 0.25 in.) in still air at an ambient temperature of 20 °C

CM-2600 Series Brushless Hollow Shaft Servo Motor with Encoder

DIMENSIONS



Model	A	B	C	D	E	F
CM-2600-000-x, in. (mm)	2.17 (55.12) max	0.7480 +0.001/-0.000 thru (19.000 +0.025/-0.000)	1.490 (37.85) dia.	0.715 ±0.015 (18.61 ±0.38)	1.321 ±0.015 (33.32 ±0.38)	1.280 ±0.015 (32.51 ±0.38)
CM-2650-000-x, in. (mm)	2.17 (55.12) max	0.7480 +0.001/-0.000 thru (19.000 +0.025/-0.000)	1.490 (37.85) dia.	0.715 ±0.015 (18.61 ±0.38)	1.321 ±0.015 (33.32 ±0.38)	1.280 ±0.015 (32.51 ±0.38)
CM-2650A-000-17S-GC, in. (mm)	3.26 (82.8) max.	0.500 ±0.002 thru (12.70 ±0.05)	0.984 (24.99) dia.	1.660 ±0.015 (42.16 ±0.38)	1.502 ±0.015 (38.15 ±0.38)	1.460 ±0.015 (37.08 ±0.38)

Torque Motors

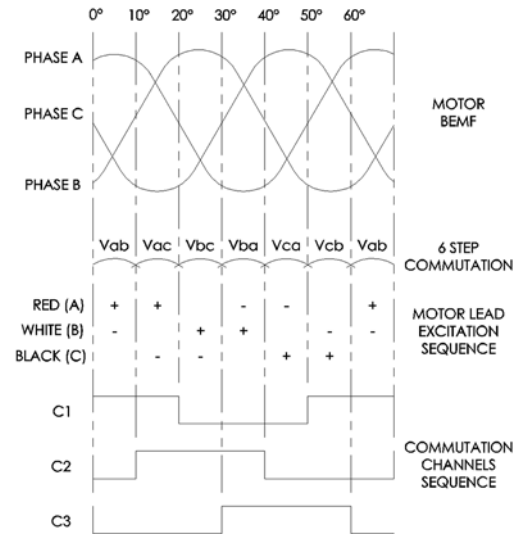
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CONNECTIONS & HALL PHASING

Lead Wire Color Coding

Encoder				Motor		Halls	
Incremental		Absolute					
A	Yellow	Dout+	White	Ph. A	Red	C1	Brown
A inv.	Orange	Dout-	Yellow	Ph. B	White	C2	Orange
B	Blue	SCL+	Green	Ph. C	Black	C3	Yellow
B inv.	Brown	SCL-	Blue			+5V to +24V	Blue
Index	Green	NSL+	Orange			Ground	Green
Index inv.	White	NSL-	Brown				
+5 VDC	Red	+5 VDC	Red				
Ground	Black	Ground	Black				
Shield	Braid						

Hall Phasing



ENCODER SPECIFICATIONS

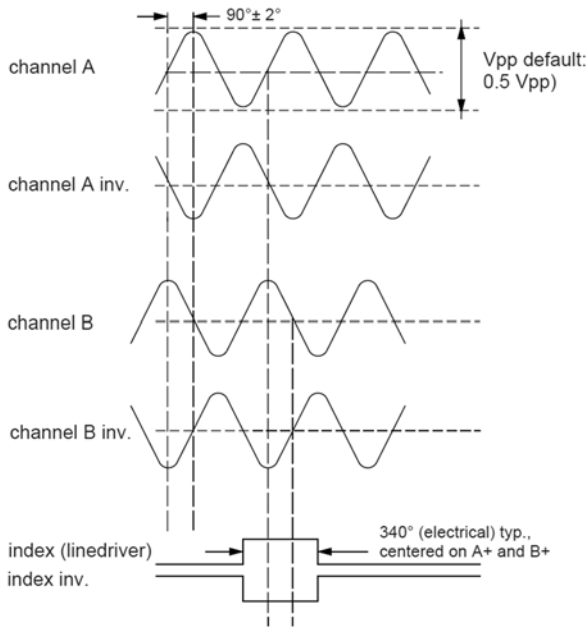
Model	CM-2600	CM-2650	CM-2650A
Type	Incremental, sine/cosine	Incremental, digital	Absolute
Format	A quad B, index	A quad B, index inverses	2-wire or 3-wire SSI Gray code
Resolution (pulses/rev: 1 pulse/rev = 4 quad counts/rev)	1000, 1024, 2000, 2048, 3600, 4096, 5000	720, 800, 1000, 1024, 1200, 1440, 2000, 2048, 3600, 4000, 4096, 5000 (7200, 8192, 10000, 12000, 16384, 25000, 25600, 31250, 32000, 50000, 51200, 62500, 64000, 90000, 100000, 102400, 112500, 125000, 128000, 156250, 180000, 200000, 204800, 225000, 250000, 256000, 312500, 360000, 400000, 409600, 450000, 500000, 512000, 625000, 720000, 819200, 900000, 1000000, 1024000, 1250000)*	17 bits/rev
Frequency Response	Flat up to 100kHz	Up to 5,000 PPR, 150 kHz min. Above 5,000 PPR, 500 kHz min.	Clock: 10 MHz, 3-wire SSI; 1.5 MHz, 2-wire SSI
Accuracy	±12 arc seconds (typ.)		Monotonicity error 1 step
Power Supply (VDC)	+5 ± 5% (60 mA max)	+5 ± 5% (150 mA max)	+5 ± 10% (100 mA max.)
Output	Default $V_{out} = \pm 0.5 V$, zero-centered	Linedriver, 26LS31, EIA std. RS 422 & DIN 66259 compatible	RS485 line transceiver

* Resolutions of 7200 and larger available with HHC version (option)

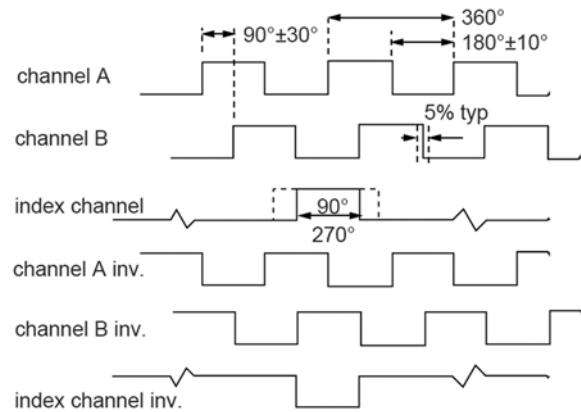
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ENCODER WAVEFORMS

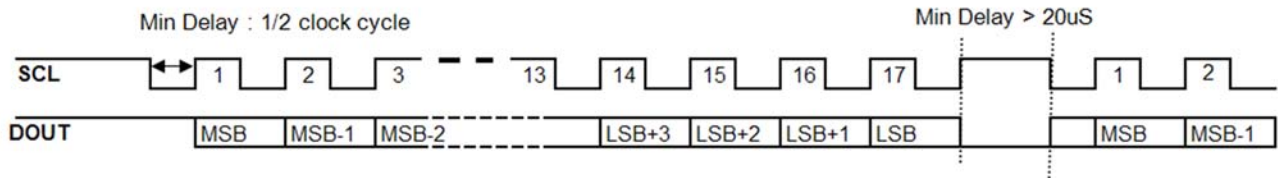
Sine-Cosine



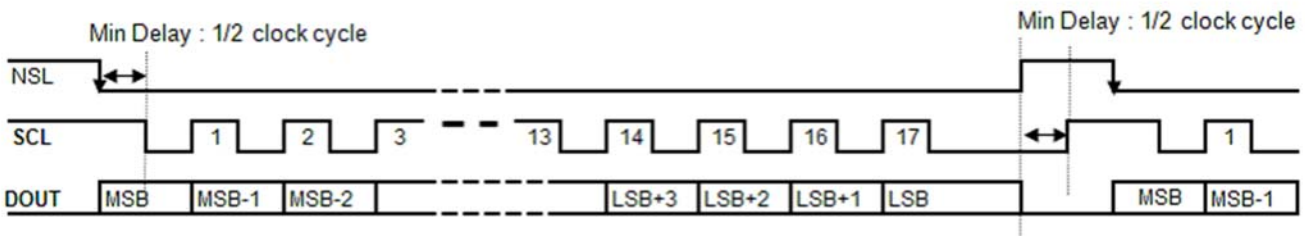
Digital Incremental



Absolute 17-bit 2-wire



Absolute 17-bit 3-wire



Note: Waveforms are for CW rotation viewed from encoder shaft end

MODEL NUMBERS

Model	Description
CM-2600-000-x	CM-2600 brushless torque motor with sine-cosine incremental encoder. Append resolution "x", maximum = 5000
CM-2650-000-x	CM-2650 brushless torque motor with digital incremental encoder. Append resolution "x", maximum = 5000. (HHC option available for resolutions from 7200 up to 1.25 million. Contact Allied Motion Solution Center for assistance.)
CM-2650A-000-17S-GC	CM-2650A brushless torque motor with absolute 17-bit Gray code encoder