



## CMI-8048-02

### High Power Density Compact BLDC Gearmotor with Integrated Digital Motor Controller

#### Description:

Composite Motors's CMI-8048-02 Series gearmotors are brushless DC motors featuring a sealed planetary gear reducer and integrated hermetic motor control electronics. Utilizing CMI's proprietary materials and packaging technologies, these motors achieve a high power density and are capable of operating in harsh environments. They are well suited for many applications including factory automation, marine, military, and aerospace. The motor controller electronics provide four quadrant motor operation at voltages up to 24V, making these an ideal choice for battery powered applications.



#### Features:

- Continuous power up to 350W in a NEMA 23 frame
- Integral AGMA 10 planetary gear reducer
- NEMA 23 mounting
- Multiple gear reductions available from 3:1 to 7:1
- Integrated hermetic motor drive electronics
- Operating supply voltage, 8 to 24 VDC
- IP68 protection rating (available)

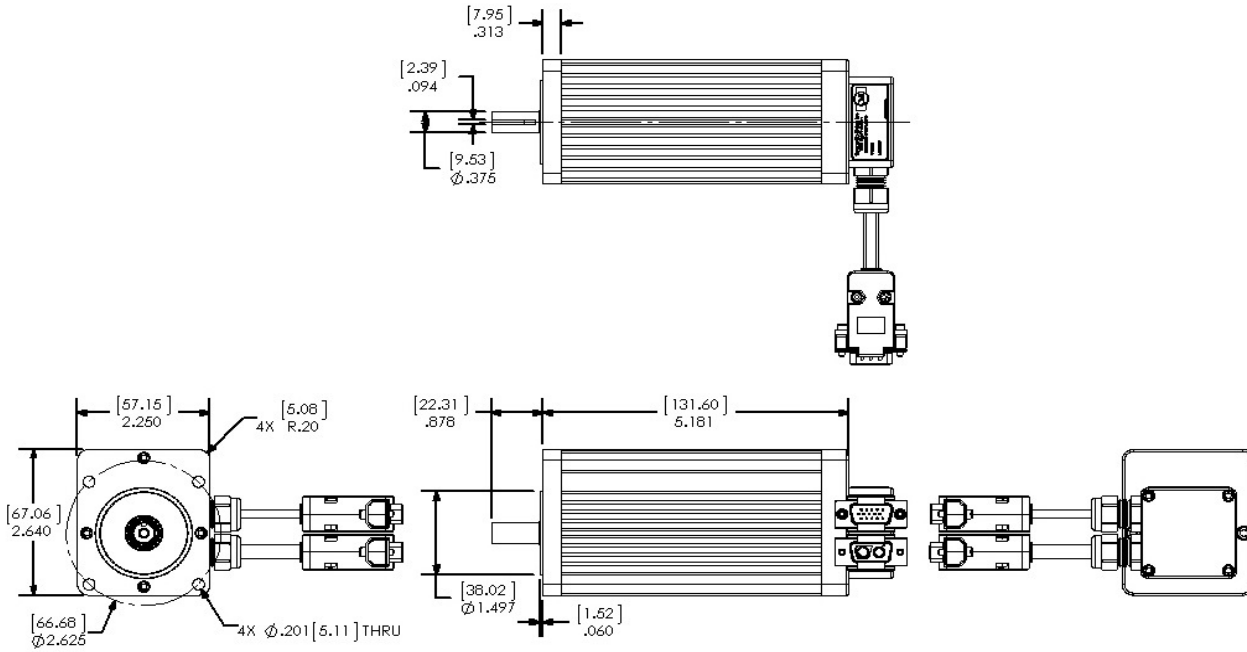
#### Applications:

- Marine
- Light Electric Vehicle (LEV)
- Military/Aerospace

**Note:** Composite Motors gives no warranties implied or otherwise regarding the information contained herein. Specifications subject to change without notice – consult factory for specific operating ranges and the latest specifications.



Figure 1 – Outline Drawing



NOTE:  
[X.XX] = mm  
X.XXX = in

Table 1 – Connector Pin-outs

Table 1 – Connector Pinouts

PIN	NAME	FUNCTION(S)	DIAGRAM
<b>Main Power</b>			
A1	DC POWER (-)	Input Voltage DC-	
A2	DC POWER (+)	Input Voltage DC+	
<b>I/O Connector</b>			
1	DIO0 / QEPA	Digital I/O / Encoder Ch A	
2	DIO1 / QEPB	Digital I/O / Encoder Ch B	
3	DIO2 / RXD	Digital I/O / Receive Data	
4	AIN0	Analog Input	
5	+3.3VDC OUT	3.3VDC Power Supply	
6	DIO4	Digital I/O	
7	COM BUS	CMI Communications Bus	
8	DIO3 / TXD	Digital I/O / Transmit Data	
9	AIN1	Analog Input	
10	N/C	Not Connected	
11	DIO5 / QEPI	Digital I/O / Encoder Index	
12	GND	Ground	
13	GND	Ground	
14	GND	Ground	
15	GND	Ground	

**Notes:**

<sup>1</sup>Consult factory for alternate connector options.

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**Motor Specifications (motor only w/o gear)**

PARAMETER	UNITS	
<b>Motor Performance<sup>(1)</sup></b>		
Input Supply Voltage	VDC	8 to 24
No Load Speed (at 24 VDC)	RPM	15000
Rated Speed	RPM	11500
Max Mechanical Speed	RPM	20000
Continuous Power <sup>(1)</sup>	Watt	350
Peak Power	Watt	700
Power Derating Factor	Watt/°C Watt/°F	1.21 0.67
Thermal Resistance, R <sub>th</sub>	°C/Watt	0.825
Thermal Time Constant, T <sub>h</sub>	Minute	10.1
Electrical Time Constant, T <sub>e</sub>	Millisecond	0.38
No Load Current	Amp	1.0
Continuous Input Supply Current	Amp	20A
Peak Input Supply Current	Amp	80.0
Continuous Torque	oz-in N-m	41 0.290
Peak Torque	oz-in N-m	163.0 1.151
Voltage Constant, K <sub>e</sub>	V <sub>PK</sub> /kRPM	0.78
Torque Constant, K <sub>t</sub>	oz-in/Amp N-m/Amp	2.104 0.015
Motor Constant, K <sub>m</sub>	oz-in/√Watt N-m/√Watt	6.950 0.049
<b>Physical</b>		
Motor Weight (including reducer)	lb kg	2.82 1.28
<b>Environment</b>		
Storage Ambient Temperature	°C °F	-40 to 125 -40 to 257
Relative Humidity	%	5 to 100
Enclosure Rating		IP68
<b>Controller Electrical Characteristics</b>		
Input Quiescent Current	mA	10 to 50
Digital Inputs	VDC	0 to 30
Digital Outputs	mA	3 to 15
Digital Outputs Open Collector	VDC	0 to 60
Digital Outputs Sinking Current Max	mA	50
Analog Voltage Range	VDC	0 to 30
+3.3VDC Supply Output Voltage Range	VDC	3.2 to 3.45
+3.3VDC Supply Typical Output Voltage	VDC	3.3

**Notes:**

Test conditions:  
Ambient temperature = 25°C.  
Input Supply Voltage = 24VDC

<sup>1</sup>At higher ambient temperatures, the motor needs to be de-rated. Consult factory.

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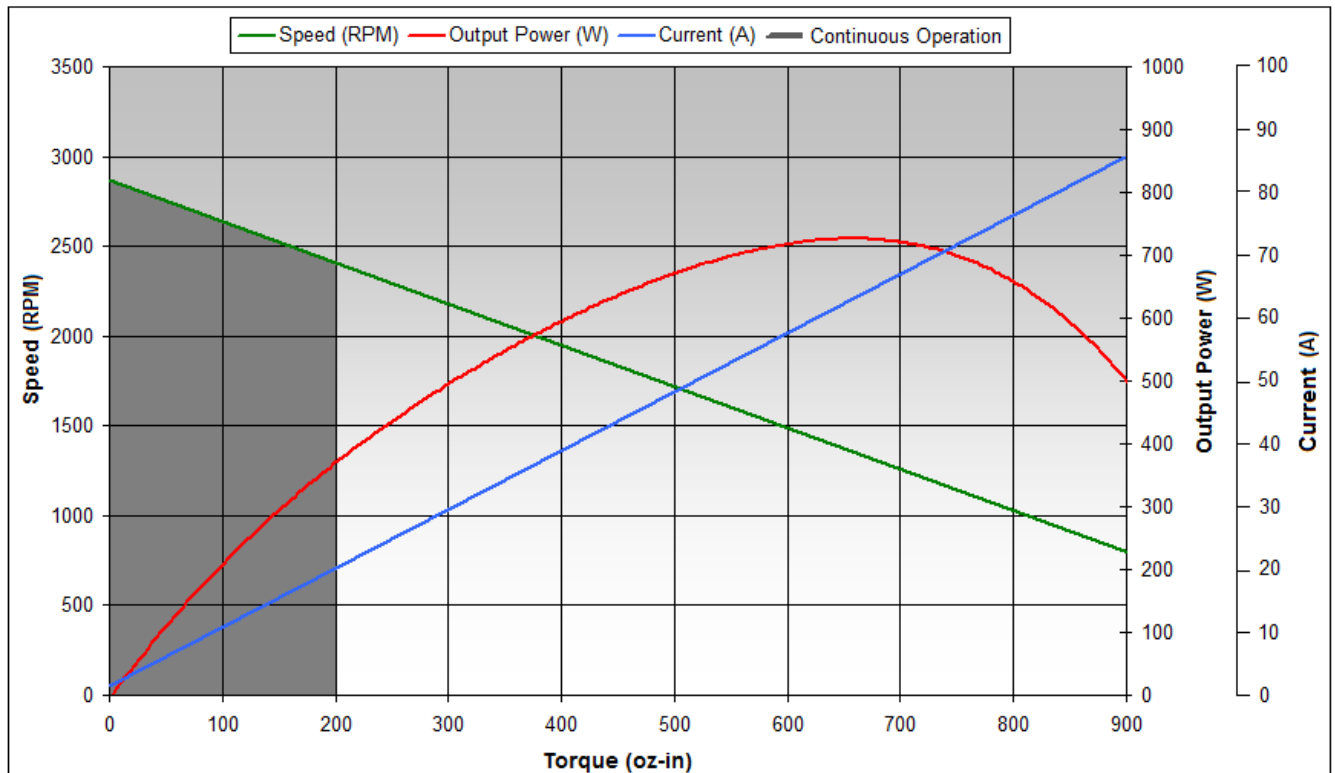


### Performance Data

Unless otherwise noted, performance data graph is based at 25°C ambient air.

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Figure 2 – Motor performance at 24VDC (5:1 Gearbox)



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## Motor Specifications with Integrated Planetary Reducer

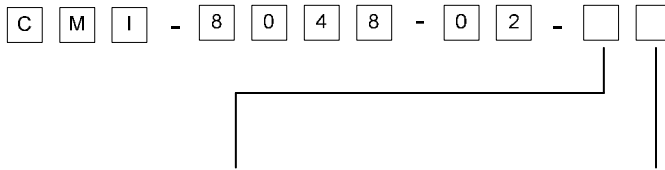
**Table 3 – Single Reduction**

PARAMETER	UNITS	1:1 <sup>1</sup>	5:1
Continuous Torque	oz-in	41	205
	N-m	.29	1.45
Peak Torque	oz-in	163	815
	N-m	1.15	5.75
No Load Speed	RPM	15,000	3000
Rated Speed	RPM	11,500	2300
Motor Inertia, J <sub>m</sub>	oz-in-sec <sup>2</sup>	0.181	
	gm-cm <sup>2</sup>	33.134	
Acceleration	krad/sec <sup>2</sup>	136.7	
Max Efficiency	%	80	
Max Backlash	degree	3.5	
Max Radial Load	lb	60	
Max Axial Load	lb	41	

**Notes:**

<sup>1</sup>Consult factory for availability

## Part Number Selection Guide



Reduction Ratio & Speed			Shaft Options	
Code	Ratio	Output RPM	Code	Type
0	1:1	5000	0	NEMA 23 mount with 3/8 dia. shaft
1	5:1	3750	1	0.187 flat on output shaft
			2	0.093 key way in output shaft
			3	Custom – Consult Factory

**Notes:**

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