

# Brushless Motor with Integral Drive

## EnduraMax 75i Series

### 75 mm (2.95-inch) BLDC Motor with Integrated Digital Drive

Allied Motion's EnduraMax 75i series motors are 75 mm (2.95 in) diameter brushless DC motors with integral drive electronics and capable of controlling torque, speed and/or position in a broad range of applications such as valve actuators, rotary and linear actuators, conveyor drives, AGV vehicle traction or steering, and similar commercial/industrial applications.

The cost-effective EnduraMax 75i is a compact, high power density motordrive unit. Compared to a brush DC motor, the EnduraMax 75i features quieter operation, longer life, and no need of brush maintenance, making it the right choice to replace DC motors in equipment modernizations or new designs.

#### Options & Accessories

- 9 or 10 mm diameter shaft
- Integral holding brake
- Connectorized cable sets
- Tailored winding designs to optimize performance
- Sealed ball bearings
- Stainless steel shaft
- IP67 protection level
- Modbus or isolated CANopen bus interface
- Low power drive "sleep" mode (with CANopen option only)
- Customized shaft, and/or mounting to match application requirements
- Alternate winding voltages



#### Features & Benefits

- Three standard stack lengths with rated continuous output power up to 370 W
- Continuous rated torque of up to 1.3 Nm (190 oz-in) and rated speed of up to 5150 RPM
- All-digital integrated drive for precise, drift-free motor control
- Standard 12, 24 or 48 VDC winding voltage selection – ideal for battery-powered applications (Alternate winding voltages available via special order)
- 5/16-inch cold-rolled steel shaft
- Heavy-duty ball bearings
- Command inputs:  $\pm 10$  VDC, 4 - 20 mA (or via optional CANopen or Modbus communication bus)
- Integrated magnetic encoder (4096 cpr) for excellent position control
- PC-based IN Control HMI software simplifies drive setup and tuning
- RS-232 setup port
- Programmable I/O: 6 inputs and 3 outputs
- Position indexing capability via communications bus or input trigger
- IP50 environmental protection level
- Automotive-class drive system protection (over-voltage, voltage reversals)
- Class F (155 °C) rated winding





#### QuickShip Products

Some of the part number configurations for this product are in stock and available for ***immediate delivery!***

Look for the QuickShip symbol next to available part numbers. Then, click on the part number to go directly to our online store.



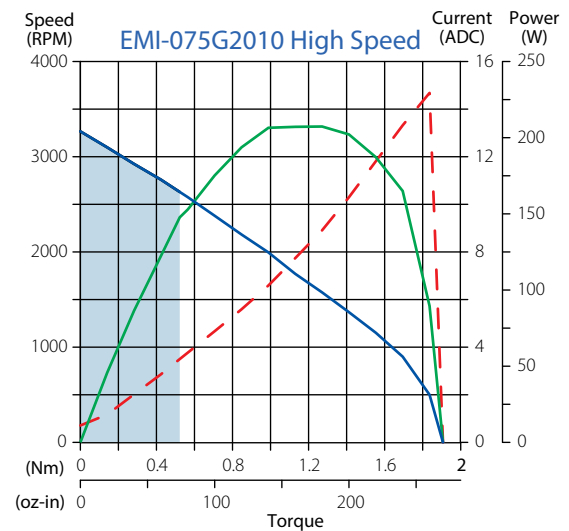
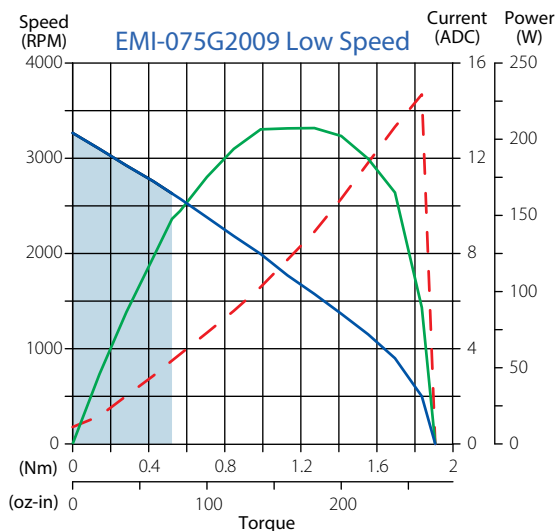
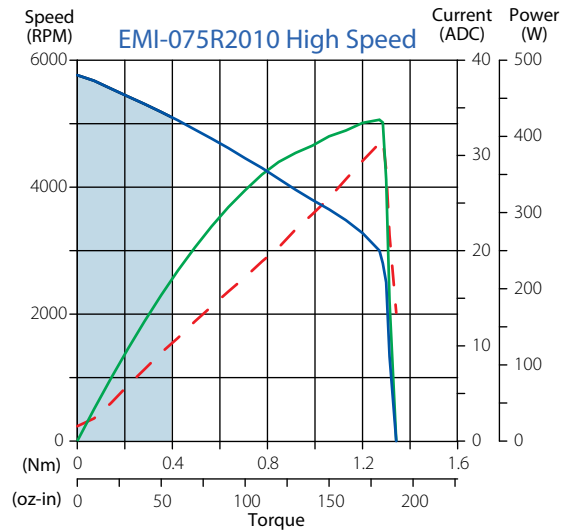
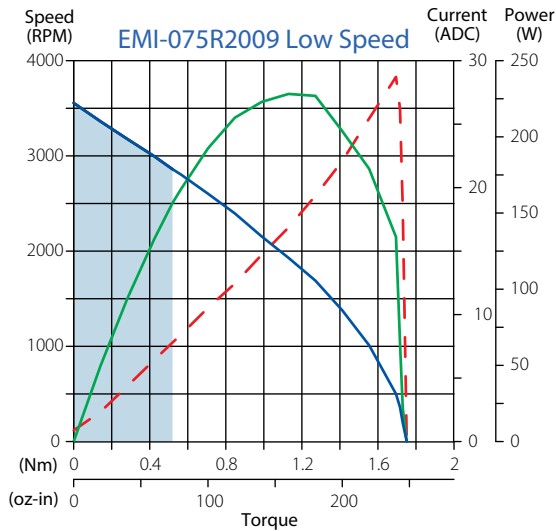
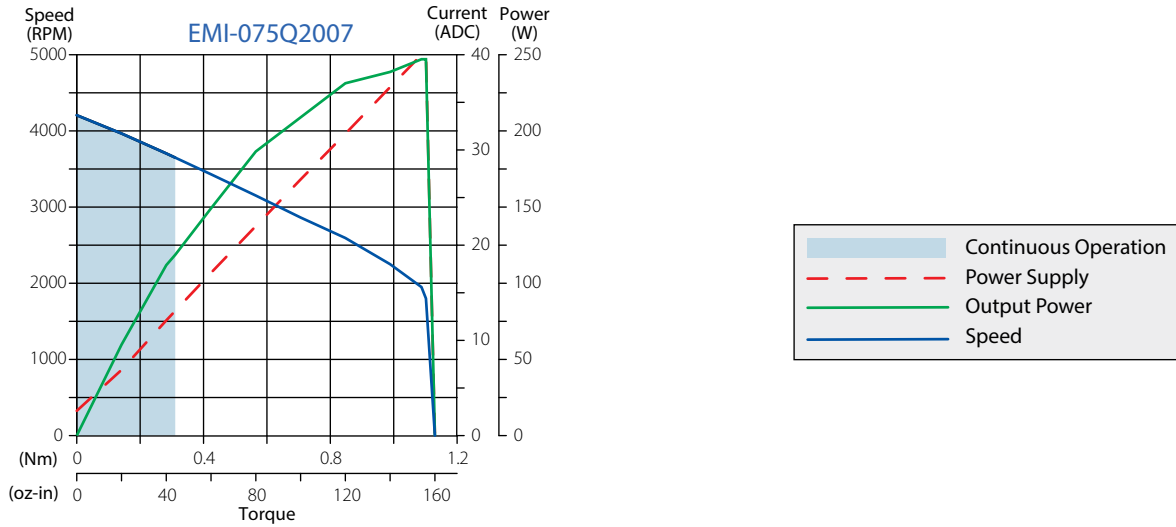
## EnduraMax 75i 2-Stack Models – Specifications

Model		EMI-075Q2007	 EMI-075R2009	 EMI-075R2010	 EMI-075G2009	 EMI-075G2010
DC Input Voltage		12 VDC	24 VDC		48 VDC	
Type			Low Speed	High Speed	Low Speed	High Speed
Rated Torque Nm (oz.in.)	Standard Models	0.31 (44)	0.55 (78)	0.39 (56)	0.55 (78)	0.54 (77)
	Fan-cooled Models	0.49 (70)	0.57 (81)	0.50 (71)	0.58 (83)	0.56 (80)
	Peak <sup>(1)</sup>	1.09 (154)	1.69 (240)	1.29 (182)	1.84 (260)	1.41 (200)
Rated Speed (RPM)	Standard Models	3675	2750	5150	2500	4600
	Fan-cooled Models	3290	2700	4900	2450	4550
No-load Speed (RPM)		4200	3500	5750	3250	5450
Rated Power <sup>(2)</sup> W (HP)	Standard Models	120 (0.16)	160 (0.21)	210 (0.28)	145 (0.19)	260 (0.35)
	Fan-cooled Models	170 (0.23)	165 (0.22)	255 (0.34)	150 (0.20)	270 (0.36)
DC Input Current (ADC)	Standard Models	13.0	9.1	10.9	4.3	7.2
	Fan-cooled Models	19.5	9.3	13.3	4.5	7.3
Thermal Resistance (°C/W)		1.90	1.90	1.63	2.58	1.01
Power Derating Factor W/°C (W/°F)		—	0.51 (0.28)	1.79 (1.00)	0.26 (0.14)	2.19 (1.22)
Motor Rotor Inertia E-5 kg·m <sup>2</sup> (oz-in·sec <sup>2</sup> )			1.56 (0.0022)			
Brake Inertia E-5 kg·m <sup>2</sup> (oz-in·sec <sup>2</sup> )			0.27 (0.0004) additional inertia with brake option			
Weight kg (lb)	Complete		0.95 (2.10)			
	Brake Only		0.15 (0.33)			
Amplifier Type		PWM (20 kHz) 4-quadrant control				
Current (Torque) Loop Type		DQ PI, 100 μs update time				
Velocity Loop		PID / PDF 200 μs update time				
Position Loop		PFF, 500 μs update time (position control through CANopen or Modbus channel only)				
Analog Input		Primary analog input: ±10VDC, 10kΩ, 12-bit resolution				
Analog Output		0 - 3.3 V, 10 mA max.				
Setup Port		RS-232, 460 kBd for setup and tuning using IN Control software on a PC				
Bus Port (Option)		Isolated CANopen or Modbus RTU, two-wire, half-duplex over RS-485				
Digital I/O		<ul style="list-style-type: none"> <li>• 6 inputs (e.g. CW, CCW limits, Enable): +3 to +60 V (high); 0 to 0.5 V (low) at 3 mA nominal draw</li> <li>• 3 outputs (e.g. Fault): open collector, +60 V max., 100 mA max. sink</li> </ul>				
Encoder		<ul style="list-style-type: none"> <li>• Type: Magnetic, integrated</li> <li>• Line count: 1024 per rev; effective resolution: 4096 cpr after internal quadrature interpolation</li> <li>• Accuracy: ±0.5 degree</li> </ul>				
Protection Features		<ul style="list-style-type: none"> <li>• Over voltage detection</li> <li>• Short-circuit and reverse polarity protection</li> <li>• I<sup>2</sup>T current foldback</li> <li>• Drive over-temperature</li> <li>• IP50, (IP67 optional)</li> </ul>				
Ambient Storage Temperature		-40 to 125 °C (-40 to 257 °F)				






(1) Maximum of 4 sec.

(2) With motor mounted to aluminum plate 200 x 200 x 10 mm (8 x 8 x 0.375 in) at 23 °C (derate motor power above 23 °C ambient temperature)

## EnduraMax 75i 2-Stack Models – Performance



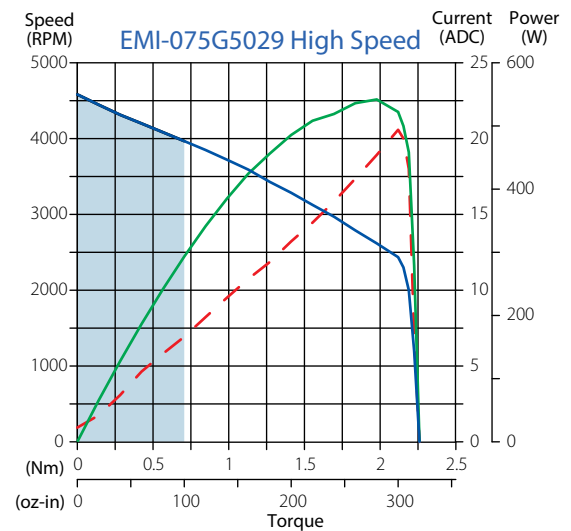
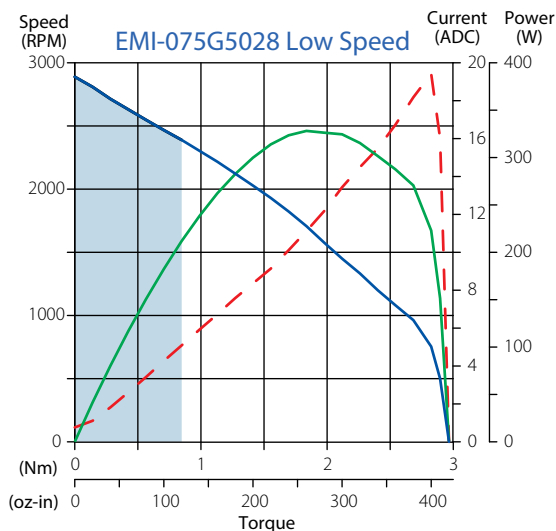
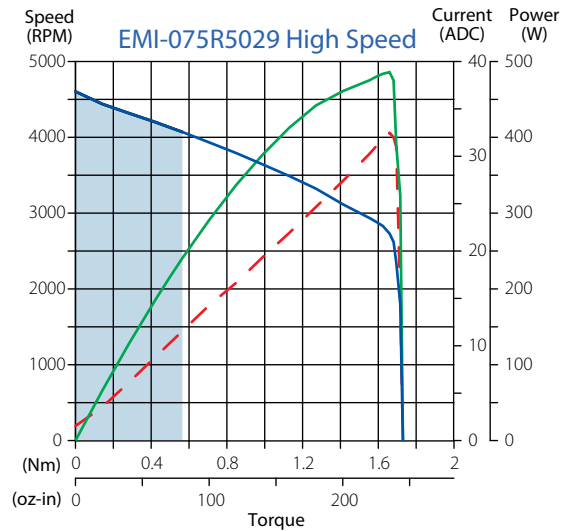
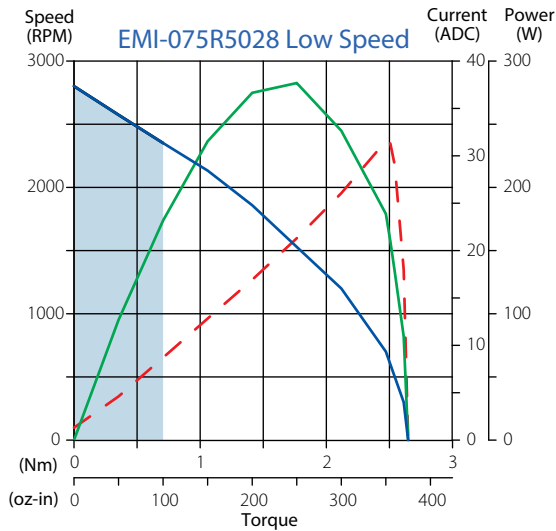
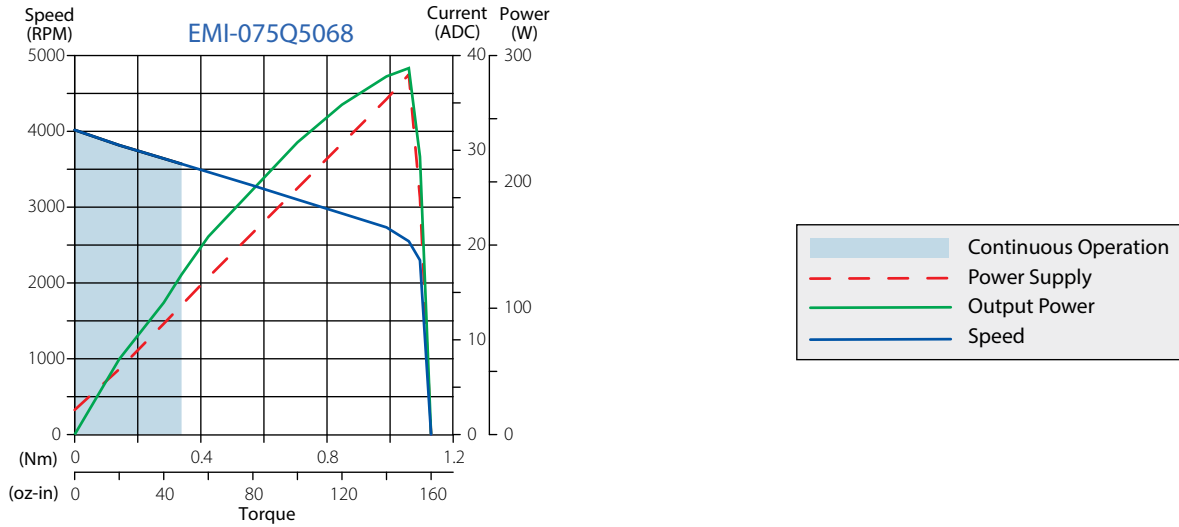
## EnduraMax 75i 5-Stack Models – Specifications

Model		 <b>EMI-075Q5068</b>	 <b>EMI-075R5028</b>	 <b>EMI-075R5029</b>	 <b>EMI-075G5028</b>	 <b>EMI-075G5029</b>
DC Input Voltage		12 VDC	24 VDC		48 VDC	
Type			Low Speed	High Speed	Low Speed	High Speed
Rated Torque Nm (oz.in.)	Standard Models	0.34 (48)	0.76 (108)	0.55 (79)	0.88 (125)	0.70 (100)
	Fan-cooled Models	0.34 (48)	0.82 (117)	0.72 (103)	0.91 (129)	0.74 (105)
	Peak <sup>(1)</sup>	1.13 (160)	2.47 (350)	1.66 (235)	2.82 (400)	2.12 (300)
Rated Speed (RPM)	Standard Models	3620	2250	4150	2300	4050
	Fan-cooled Models	3400	2150	3950	2300	4000
No-load Speed (RPM)		4020	2800	4550	2900	4550
Rated Power <sup>(2)</sup> W (HP)	Standard Models	128 (0.17)	180 (0.24)	240 (0.32)	215 (0.28)	300 (0.40)
	Fan-cooled Models	183 (0.25)	185 (0.25)	300 (0.40)	220 (0.29)	310 (0.41)
DC Input Current (ADC)	Standard Models	13.7	10.3	12.2	6.1	7.6
	Fan-cooled Models	20.0	10.5	15.5	6.3	8.0
Thermal Resistance (°C/W)		1.50	1.91	1.65	1.93	2.13
Power Derating Factor W/°C (W/°F)		—	0.87 (0.48)	1.98 (1.10)	0.79 (0.44)	3.50 (1.94)
Motor Rotor Inertia E-5 kg-m <sup>2</sup> (oz-in-sec <sup>2</sup> )		2.48 (0.0035)				
Brake Inertia E-5 kg-m <sup>2</sup> (oz-in-sec <sup>2</sup> )		0.27 (0.0004) additional inertia with brake option				
Weight kg (lb)	Complete	1.24 (2.73)				
	Brake Only	0.15 (0.33)				
Amplifier Type	PWM (20 kHz) 4-quadrant control					
Current (Torque) Loop Type	DQ PI, 100 μs update time					
Velocity Loop	PID / PDF 200 μs update time					
Position Loop	PFF, 500 μs update time (position control through CANopen or Modbus channel only)					
Analog Input	Primary analog input: ±10VDC, 10kΩ, 12-bit resolution					
Analog Output	0 - 3.3 V, 10 mA max.					
Setup Port	RS-232, 460 kBd for setup and tuning using IN Control software on a PC					
Bus Port (Option)	Isolated CANopen or Modbus RTU, two-wire, half-duplex over RS-485					
Digital I/O	<ul style="list-style-type: none"> <li>• 6 inputs (e.g. CW, CCW limits, Enable): +3 to +60 V (high); 0 to 0.5 V (low) at 3 mA nominal draw</li> <li>• 3 outputs (e.g. Fault): open collector, +60 V max., 100 mA max. sink</li> </ul>					
Encoder	<ul style="list-style-type: none"> <li>• Type: Magnetic, integrated</li> <li>• Line count: 1024 per rev; effective resolution: 4096 cpr after internal quadrature interpolation</li> <li>• Accuracy: ±0.5 degree</li> </ul>					
Protection Features	<ul style="list-style-type: none"> <li>• Over voltage detection</li> <li>• Short-circuit and reverse polarity protection</li> <li>• I<sup>2</sup>T current foldback</li> <li>• Drive over-temperature</li> <li>• IP50, (IP67 optional)</li> </ul>					
Ambient Storage Temperature	-40 to 125 °C (-40 to 257 °F)					





(1) Maximum of 4 sec.

(2) With motor mounted to aluminum plate 200 x 200 x 10 mm (8 x 8 x 0.375 in) at 23 °C (derate motor power above 23 °C ambient temperature)

## EnduraMax 75i 5-Stack Models – Performance



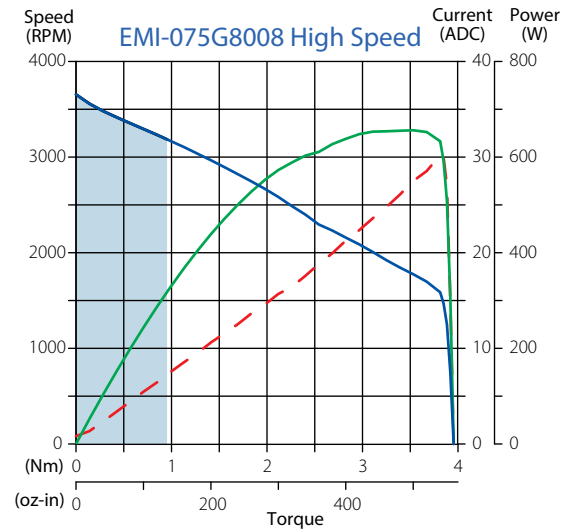
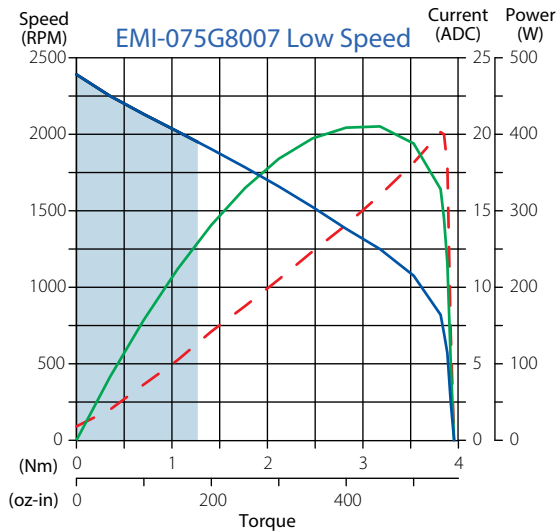
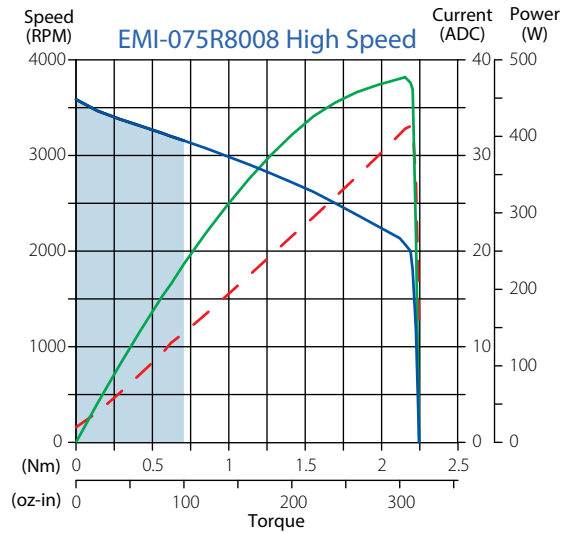
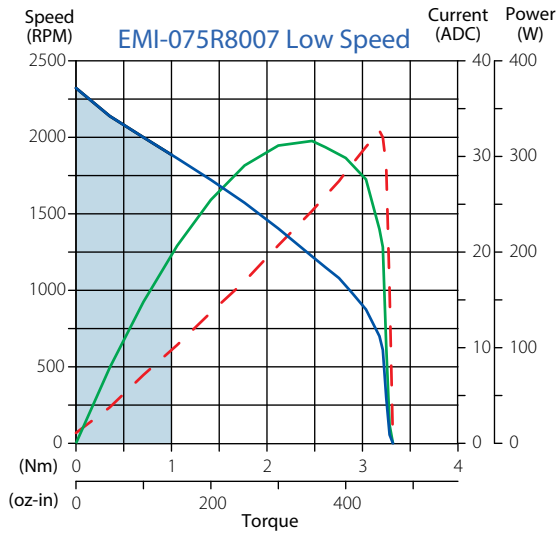
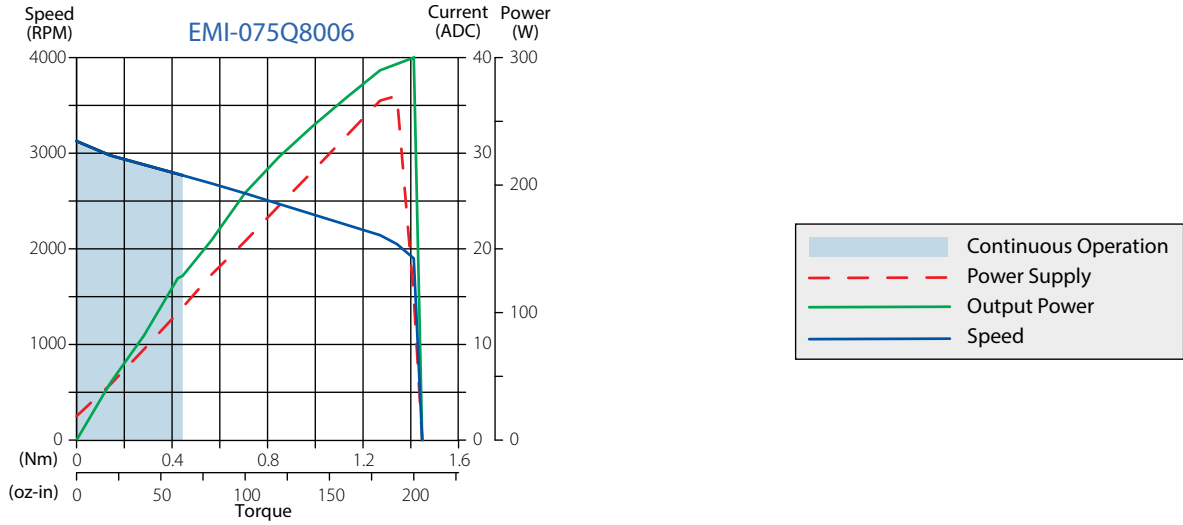
## EnduraMax 75i 8-Stack Models – Specifications

Model		 	 			
	EMI-075Q8006	EMI-075R8007	EMI-075R8008	EMI-075G8007	EMI-075G8008	
DC Input Voltage	12 VDC	24 VDC		48 VDC		
Type		Low Speed	High Speed	Low Speed	High Speed	
Rated Torque Nm (oz.in.)	Standard Models	0.45 (63)	1.00 (142)	0.70 (100)	1.27 (180)	0.95 (135)
	Fan-cooled Models	0.49 (70)	1.16 (165)	0.93 (132)	1.36 (193)	1.13 (161)
	Peak <sup>(1)</sup>	1.45 (205)	3.18 (450)	2.19 (310)	3.81 (540)	3.81 (540)
Rated Speed (RPM)	Standard Models	2790	1850	3150	1900	3250
	Fan-cooled Models	2730	1750	3000	1850	3100
No-load Speed (RPM)		3125	2300	3550	2350	3700
Rated Power <sup>(2)</sup> W (HP)	Standard Models	130 (0.17)	195 (0.26)	235 (0.31)	255 (0.34)	325 (0.43)
	Fan-cooled Models	141 (0.19)	215 (0.28)	295 (0.39)	265 (0.35)	370 (0.49)
DC Input Current (ADC)	Standard Models	14.0	10.6	11.9	7.1	8.1
	Fan-cooled Models	15.3	12.3	15.6	7.5	9.6
Thermal Resistance (°C/W)		1.30	1.92	1.70	1.48	1.00
Power Derating Factor W/°C (W/°F)		—	1.17 (0.65)	1.66 (0.92)	2.01 (1.12)	3.35 (1.86)
Motor Rotor Inertia E-5 kg-m <sup>2</sup> (oz-in-sec <sup>2</sup> )		3.35 (0.0048)				
Brake Inertia E-5 kg-m <sup>2</sup> (oz-in-sec <sup>2</sup> )		0.27 (0.0004) additional inertia with brake option				
Weight kg (lb)	Complete			1.50 (3.30)		
	Brake Only			0.15 (0.33)		
Amplifier Type	PWM (20 kHz) 4-quadrant control					
Current (Torque) Loop Type	DQ PI, 100 μs update time					
Velocity Loop	PID / PDF 200 μs update time					
Position Loop	PFF, 500 μs update time (position control through CANopen or Modbus channel only)					
Analog Input	Primary analog input: ±10VDC, 10kΩ, 12-bit resolution					
Analog Output	0 - 3.3 V, 10 mA max.					
Setup Port	RS-232, 460 kBd for setup and tuning using IN Control software on a PC					
Bus Port (Option)	Isolated CANopen or Modbus RTU, two-wire, half-duplex over RS-485					
Digital I/O	<ul style="list-style-type: none"> <li>• 6 inputs (e.g. CW, CCW limits, Enable): +3 to +60 V (high); 0 to 0.5 V (low) at 3 mA nominal draw</li> <li>• 3 outputs (e.g. Fault): open collector, +60 V max., 100 mA max. sink</li> </ul>					
Encoder	<ul style="list-style-type: none"> <li>• Type: Magnetic, integrated</li> <li>• Line count: 1024 per rev; effective resolution: 4096 cpr after internal quadrature interpolation</li> <li>• Accuracy: ±0.5 degree</li> </ul>					
Protection Features	<ul style="list-style-type: none"> <li>• Over voltage detection</li> <li>• Short-circuit and reverse polarity protection</li> <li>• I<sup>2</sup>T current foldback</li> <li>• Drive over-temperature</li> <li>• IP50, (IP67 optional)</li> </ul>					
Ambient Storage Temperature	-40 to 125 °C (-40 to 257 °F)					

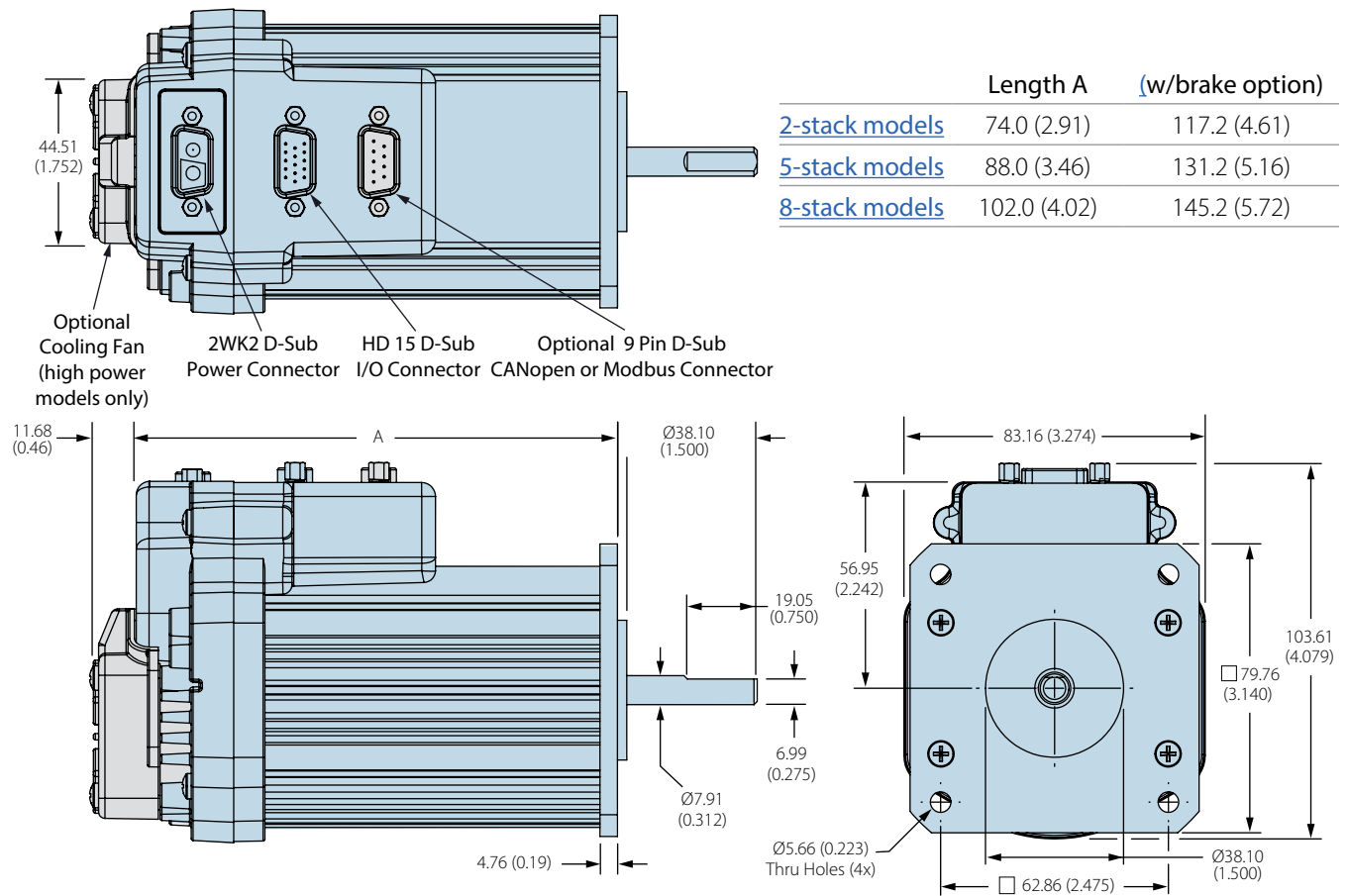
(1) Maximum of 4 sec.

(2) With motor mounted to aluminum plate 200 x 200 x 10 mm (8 x 8 x 0.375 in) at 23 °C (derate motor power above 23 °C ambient temperature)

# EnduraMax 75i 8-Stack Models – Performance

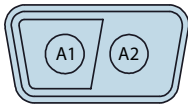


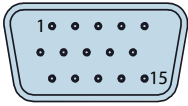
**EnduraMax 75i Dimensions — mm (in)**

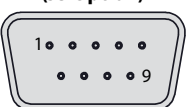




## EnduraMax 75i Electrical Connections

Motor Power (J1)	
	
Pin	Function
1	DC Power (-)
2	DC Power (+)
<b>Mate:</b>	Konmek PS400N-2WK2FTB0
<b>Sealed Mate:</b>	Konmek PS400N-2WK2FTB0 w/HW1-1 shroud

User I/O (J2)	
	
Pin	Function
1	Input 1
2	Input 2
3	Input 3
4	Input 4
5	Analog Input 1 (+)
6	Input 5
7	Input 6
8	RS232 Rx / RS485 (-)
9	Output 1
10	Analog Input 1 (-)
11	Output 2
12	Output 3
13	RS232 Tx / RS485 (+)
14	Common
15	Analog Output
<b>Mate:</b>	Konmek HS0-15FTB0
<b>Sealed Mate:</b>	Konmek HS0-15FTB0 w/HW1-1 shroud

CANopen or Modbus (J3 Option)	
	
Pin	Function
1	Modbus Common
2	CANL
3	CAN COM
4	Modbus Tx / Rx (-)
5	—
6	—
7	CANH
8	Modbus Tx / Rx (+)
9	CANV+
<b>Mate:</b>	Konmek DS0-09FTB0
<b>Sealed Mate:</b>	Konmek DS0-09FTB0 w/HW1-1 shroud

## EnduraMax 75i Cables & Connector Accessories

	Description	Part Number
<b>I/O Cables</b>	I/O Lead Assembly, 1 m, female 15-pin D-Sub to 9-pin D-sub	AC-CB-822001
	CAN Lead Assembly, 1 m, female 9-pin D-Sub to 6.4 mm strip	AC-CB-822004
	CAN Lead Assembly, 1 m, female 9-pin D-Sub to 6.4 mm strip, seal/shield	AC-CB-822014
	CAN Lead Assembly, 3 m, female 9-pin D-Sub to 6.4 mm strip	AC-CB-822005
	CAN Lead Assembly, 3 m, female 9-pin D-Sub to 6.4 mm strip, seal/shield	AC-CB-822015
	1 m, 15-pin D-Sub to 6.4 mm strip	AC-CB-822002
	1 m, 15 pin D-Sub to 6.4 mm strip, seal shield	AC-CB-822012
	3 m, 15-pin D-Sub to 6.4 mm strip	AC-CB-822003
	3 m, 15-pin D-Sub to 6.4 mm strip, seal/shield	AC-CB-822013
	<b>Power Cables</b>	Power Lead Assembly, 1 m, Konmek power D-Sub 2-wire, 10 gauge, sealed
Power Lead Assembly, 3 m, Konmek power D-Sub 2-wire, 10 gauge, sealed		AC-CB-822011
1 m, D-Sub 2-wire, 10 gauge, to flying leads		AC-CB-822006
1 m, D-Sub 2-wire, 14 gauge, to flying leads		AC-CB-822008
1 m, D-Sub 2-wire, 10 gauge, seal/shield		AC-CB-822016
3 m, D-Sub 2-wire, 10 gauge, to flying leads		AC-CB-822007
<b>Connector Kits</b>	3 m, D-Sub 2-wire, 14 gauge, to flying leads	AC-CB-822009
	3 m, D-Sub 2 wire, 14 gauge, seal/shield	AC-CB-822017
	15 pin, (2) 9-pin, 2-pin power D-Sub + hoods	AC-CK-100103
<b>USB to RS232</b>	15 pin, (2) 9-pin, 2-pin power D-Sub + hoods, sealed	AC-CK-100105
	USB to high speed RS232, 1.75 m cable	AC-CB-100104
<b>IP67 Cover</b>	For unused D-Sub connector	AC-CK-100114

## Documents & Software

Documentation and most software are available for download from the Allied Motion website ([www.alliedmotion.com](http://www.alliedmotion.com))

**34-21001** Hardware Manual: Wiring and Installation (PDF)

**34-22001** Software Manual: IN Control User Guide (PDF)

**34-2202** Software Manual: Parameters and Control Structure (PDF) + (Attachment A) Sortable Parameters and Variables List (Excel file)

— ALLNET .NET Framework software

## Custom & Specific-Purpose Products & Sub-Assemblies

Allied Motion offers a very wide selection of standard motion control solutions to satisfy the requirements found in the commercial, industrial and aerospace and defense markets. And, we are adding new products every year to meet new demands we find in those markets.

However, a recognized strength of Allied Motion is our willingness and ability to develop custom motion control products and systems to meet the specific needs of customers. Please contact us to discuss your specialized application requirements.

## Allied Motion Solution Centers

Allied Motion maintains Solution Centers in three geographically strategic locations to assist our customers with all aspects of their product selection and buying decisions. These facilities assure local support no matter your location around the globe.

Each Solution Center's experienced application engineering and customer service team provide:

- Application analysis assistance
- Detailed product information and documentation
- Standard product selection
- Product customization and options guidance
- Specification development assistance for custom-design products
- Price quotations
- Ordering, order status and shipment information
- Logistics assistance

For assistance with your project, contact us at one of our continental Allied Motion Solution Centers listed below.

Allied Motion also has a global network of factory trained selling partners to serve you. Visit our website for contact information for the Allied Motion Sales Partner nearest you.



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## Europe

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