

# Brushless Direct Drive Torque Motors Megaflux MFH170i Series

## Large-Bore Hollow Shaft Housed Torque Motor with Integrated Digital Servo Drive and Optical Encoder

Allied Motion's Megaflux MFH170i series of 170 mm (6.7 in) diameter housed brushless torque motors consists of a high performance brushless DC torque motor, a digital servo drive, and an optical encoder, all integrated into a rugged machined aluminum housing with robust bearings.

The MFH170i series features a 63.5 mm (2.5 in) large-bore through shaft, and is characterized by a very high torque-to-inertia ratio. There are three stack lengths in the series with peak torque ranging from 10.6 up to 16.9 Nm (1500 up to 2400 oz-in). The standard winding voltage is 48 V.

This product was specifically designed for direct drive, high resolution positioning applications in semiconductor wafer handler robots, turret scanners, and similar precision manufacturing equipment and instrumentation.

The series is offered as standard with an integrated optical sine-cosine encoder, CANopen / Modbus RTU communication ports, and DB-style connectors.

### Options & Accessories

- Connectorized mating cables
- Programmable-interpolation encoder with multiplier from  $2^2$  up to  $2^{14}$



### Features & Benefits

- $\varnothing 170$  mm (6.7 in) OD;  $\varnothing 63.5$  mm (2.5 in) ID large-bore hollow-shaft
- Peak torque up to 16.9 Nm (2400 oz-in) and rated speed to 1000 RPM
- Integrated servo drive with CANopen and Modbus
- Integrated optical incremental encoder
- Large-bore 63.5 mm (2.5 in) through-shaft allowing passage of air, fluid, and/or vacuum lines, optical beams, and/or electrical lines
- Sinusoidal SVM commutation for efficient, smooth operation
- High torque-to-inertia ratio and motor constant for responsive and efficient operation
- High performance integrated digital servo drive for compactness and reduced system wiring complexity
- 3600 line integral sine encoder, 14400 counts/rev effective resolution
- Position control via CANopen, Modbus or .NET framework
- RoHS compliant

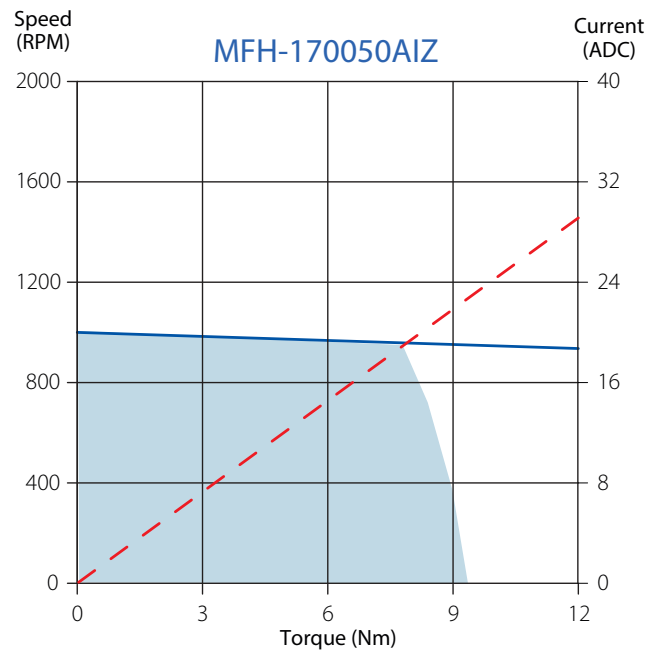
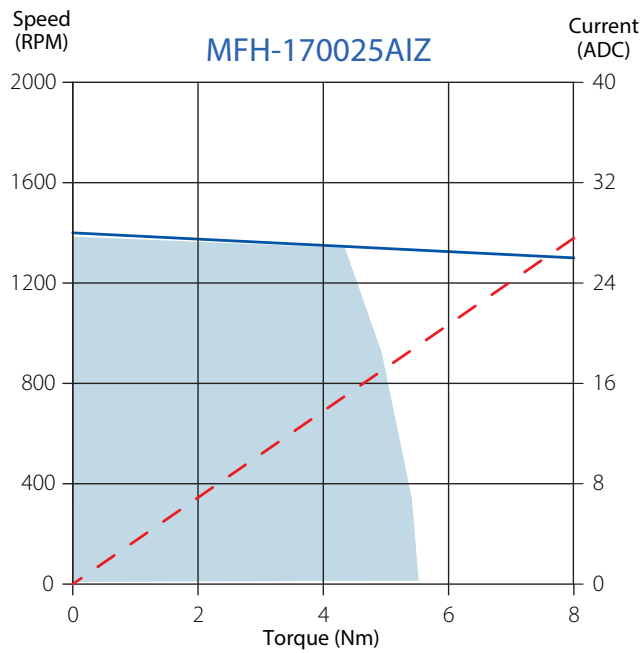
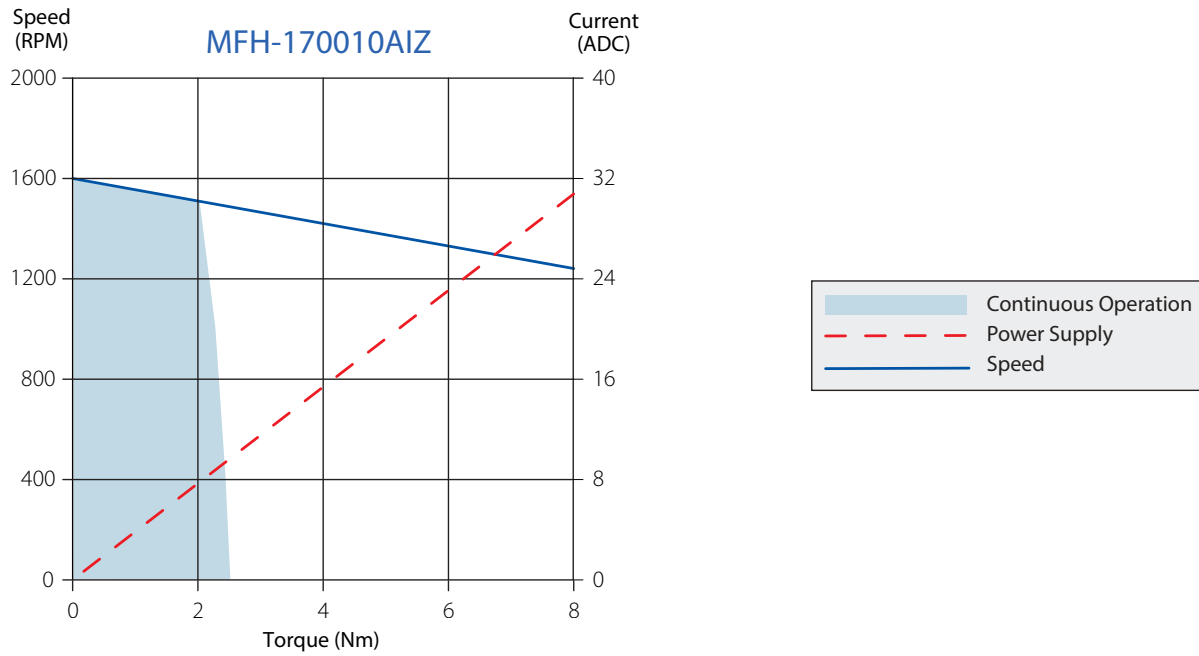
## Megaflux 170i – Specifications

Model	MFH-170010AIZ	MFH-170025AIZ	MFH-170050AIZ	
DC Input Voltage	48 VDC			
Rated Torque (Nm)	Continuous Stall	2.66	6	10
	@ Rated Speed	2.17	4.8	8.5
	Peak <sup>(1)</sup>	10.6	11.9	16.9
Rated Speed (RPM)	1000	1000	750	
No-load Speed (RPM)	1600	1400	1000	
Rated Power <sup>(2)</sup> (W)	227	502	670	
DC Input Current (ADC)	5.6	11.7	15.5	
Thermal Resistance (°C/W)	1.3	0.9	0.8	
Motor Rotor Inertia (E-3 kg-m <sup>2</sup> )	3.05	4.60	7.05	
Weight (kg)	5	6.8	10	
Amplifier Type	PWM (20 kHz nominal) 4-quadrant control with sinusoidal SVM commutation			
Current (Torque) Loop	DQ PI, 100 µs update time			
Velocity Loop	PID / PDF 200 µs update time			
Position Loop	PFF, 500 µs update time			
Command Input	<ul style="list-style-type: none"> <li>• Primary analog input: ±10VDC, 10kΩ, 12-bit resolution</li> <li>• Secondary analog input: ±10VDC, 500Ω, 12-bit resolution (or 4 - 20 mA)</li> </ul>			
Setup Port	RS-232, 460 kBd for setup and tuning using INControl software on a PC			
Bu	Isolated CANopen (+10 V to +32 V, 50 mA) or Modbus RTU (two-wire, half-duplex over RS-485)			
Digital I/O	<ul style="list-style-type: none"> <li>• 6 inputs: Current-sourcing, +3 to +60 V (high), 0 to 0.5 V (low) at 3 mA nominal draw</li> <li>• 3 outputs: Current-sinking, open collector, +60 V max., 100 mA sink</li> </ul>			
Analog Output	0 - 5 V, 12-bit resolution			
Encoder	<ul style="list-style-type: none"> <li>• Type: Integral optical sine/cosine</li> <li>• Resolution: 3600 lines, 14400 counts/rev after quadrature interpolation (encoder signals not available for external use)</li> <li>• Disk accuracy: 1.25 arc seconds</li> </ul>			
Protection Features	<ul style="list-style-type: none"> <li>• DC supply bus over- or under-voltage</li> <li>• Short-circuit and reverse polarity</li> <li>• I<sup>2</sup>T current foldback</li> <li>• Drive over-temperature</li> <li>• Motor over-temperature</li> <li>• IP50</li> </ul>			
Ambient Temperature	Operating	-20 to 40 °C		
	Storage	-40 to 100 °C		

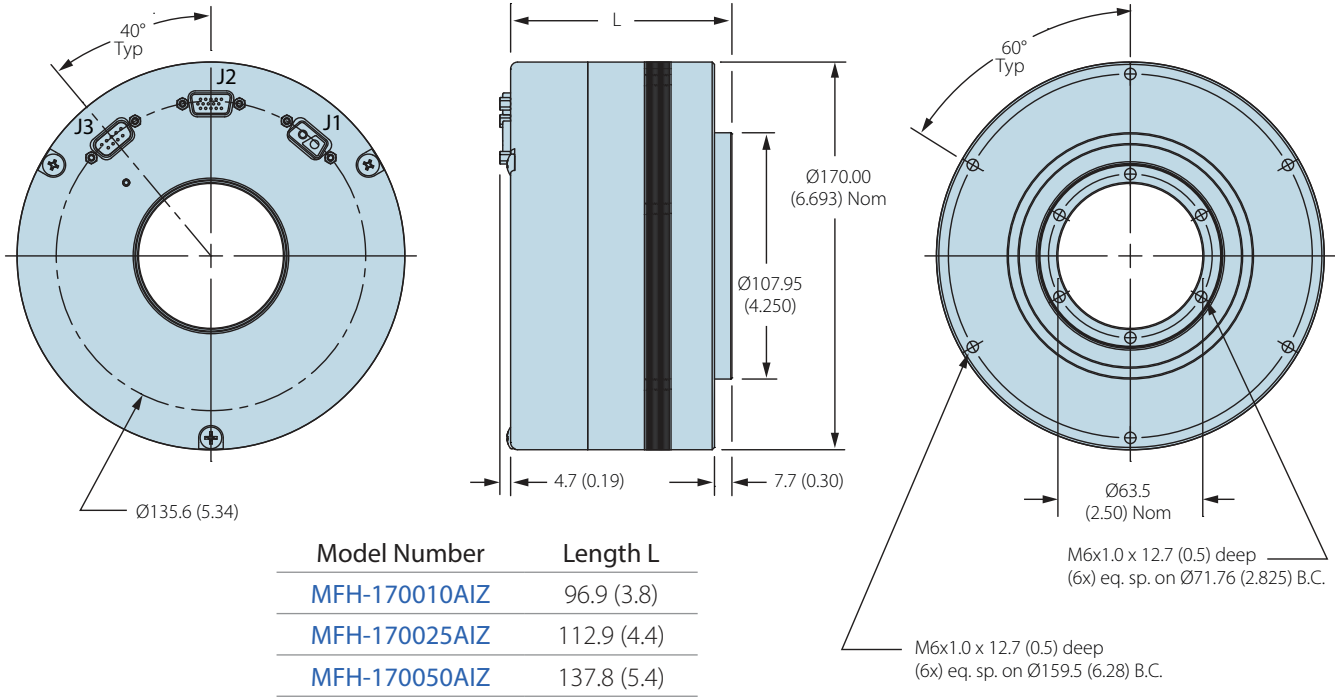
(1) Maximum of 4 sec.

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

## Megaflux 170i – Performance

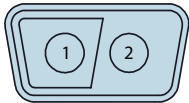


**Megaflux 170i — mm (in)**



**Megaflux 170i Electrical Connections**

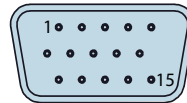
**Motor Power (J1)**



Pin	Function
1	DC Power (-)
2	DC Power (+)

Mate: Konmek PS400N-2WK2FTB0  
Sealed Mate: Konmek PS400N-2WK2FTB0 w/HW1-1 shroud

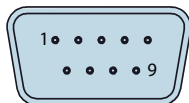
**User I/O (J2)**



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
9	Output 1
10	Analog Input 1 (-)
11	Output 2
12	Output 3
13	RS232 Tx
14	Common
15	Analog Input 2 (+)

Mate: Konmek HS0-15FTB0  
Sealed Mate: Konmek HS0-15FTB0 w/HW1-1 shroud

**CANopen or Modbus (J3)**



Pin	Function
1	Modbus/Analog Out Common
2	CANL
3	CAN COM
4	Modbus Tx / Rx (-)
5	—
6	Analog Out
7	CANH
8	Modbus Tx / Rx (+)
9	CANV+

Mate: Konmek DS0-09FTB0  
Sealed Mate: Konmek DS0-09FTB0 w/HW1-1 shroud

## Megaflux 170i Cable Accessories

	Description	Part Number
I/O Cables	1 m, 15 pin D-Sub to 6.4 mm strip	AC-CB-822002
	3 m, 15 pin D-Sub to 6.4 mm strip	AC-CB-822003
CAN/ Modbus Cables	1 m, 9 pin D-Sub to 6.4 mm strip	AC-CB-822004
	3 m, 9 pin D-Sub to 6.4 mm strip	AC-CB-822005
Power Cables	1 m, D-Sub 2-wire, 10 gauge, to flying leads	AC-CB-822006
	3 m, D-Sub 2-wire, 10 gauge, to flying leads	AC-CB-822007
	1 m, D-Sub 2-wire, 14 gauge, to flying leads	AC-CB-822008
	3 m, D-Sub 2-wire, 14 gauge, to flying leads	AC-CB-822009

## Documents & Software

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

34-2100	Hardware Manual: Wiring and Installation (PDF)
34-2200	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)
34-2300	Communications Manual - CANopen
34-2301	Communications Manual - Modbus
AM_Drive CANopen MODBUS params.xls	CANopen and MODBUS parameter/variable mapping spreadsheet
AM_Drive.eds	Allied Motion EDS file for CANopen drives
—	ALLNET .NET Framework software

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