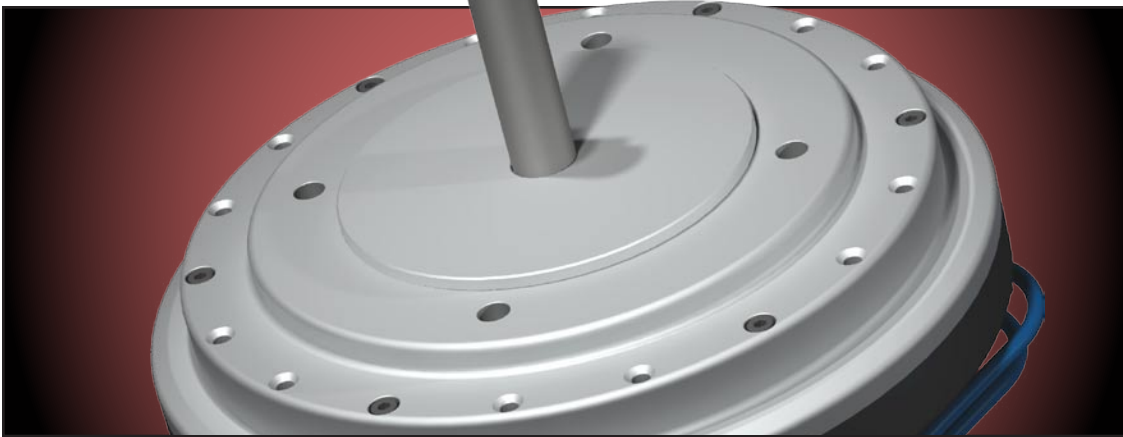


# E225

## Axial Flux BLDC Motor



### Typical Applications

- Compressors/Blowers
- Servo Applications
- Precision Robotics
- Marine Propulsion
- Generators
- Weapons Turrets

### Application Information

- Requires 3-phase H-bridge PWM inverter, available through Lynx
- Performance ratings based on air-cooled 105°C winding, 25°C ambient air
- Developed for use in a high-efficiency air-moving application

### Standard Features

- Brushless axial flux design
- Use of patented SEMA coil provides superior power density
- Ironless design eliminates cogging torque
- Extremely linear torque constant independent of speed

The E225 motor was developed to serve as part of a permanent-magnet motor system for air-handling applications, where system efficiency is a high priority. When coupled with its 3-phase H-bridge inverter, this motor offers a highly efficient motor/inverter combination with the high peak torque capability required for the most demanding high-transient applications, including fuel-cell air compressors.

In addition to the E225, a number of other coil configurations for this frame size are under development that exhibit a wide variety of desired motor characteristics. The resulting family of 225 mm motor designs, currently being developed with government and commercial partners, will offer a broad range of possible system configurations for speed and position servo applications requiring both high efficiency and high torque.

The specifications provided here illustrate some of the E225's extraordinary capabilities. For example, the E225 achieves a very high peak-to-continuous torque ratio and a high peak efficiency. Low-speed, high-torque versions of this motor are currently under development to serve as direct-drive position servomotors in robotics applications. Preliminary specifications for this configuration, to be called the S225, are included in this document.

Call a Lynx applications engineer to determine if there is a 225 mm SEMA design that can meet your needs.



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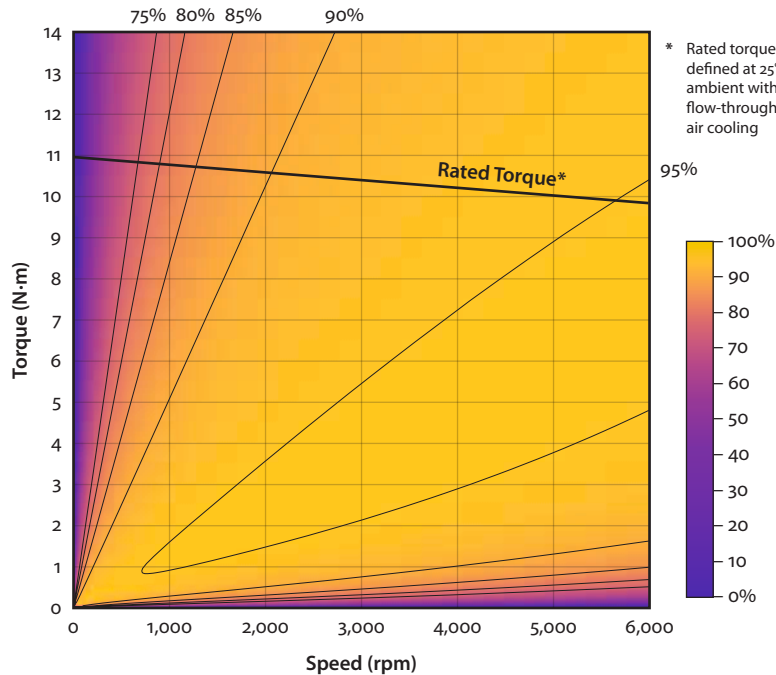
9540 Highway 150  
PO Box 250  
Greenville, Indiana 47124-0250  
<http://www.LynxMotionTechnology.com/>  
Phone (812) 949-7924 • Fax (812) 949-7946

# E225

Parameter	Symbol	SI	English
<b>Continuous Ratings</b>			
Supply Voltage (DC bus)	$V_s$	155 V <sub>DC</sub>	155 V <sub>DC</sub>
Voltage (phase voltage H-bridge)	$V$	117 V <sub>rms</sub>	117 V <sub>rms</sub>
Speed	$S$	6,000 rpm	6,000 rpm
Torque	$T_c$	9.9 N·m	7.3 lbf·ft
Current	$I$	18.7 A <sub>rms</sub>	18.7 A <sub>rms</sub>
Power	$P_{out}$	6.2 kW	8.3 hp
<b>Peak Ratings</b>			
Peak Torque <sup>1</sup>	$T_{pk}$	97.4 N·m	71.8 lbf·ft
Peak Current <sup>1</sup>	$I_{pk}$	180.0 A	180.0 A
<b>Motor Constants</b>			
Torque Constant	$K_T$	0.53 N·m/A	0.39 lbf·ft/A
Back EMF Constant (per phase)	$K_E$	19 V <sub>rms</sub> /krpm	19 V <sub>rms</sub> /krpm
Electrical Time Constant	$\tau_e$	348 ns	348 ns
<b>Electrical Aspects</b>			
Resistance (100°C)	$R$	204 mΩ	204 mΩ
Inductance	$L$	71 μH	71 μH
<b>Mechanical Aspects</b>			
Inertia (rotor only)	$J_r$	18.4 g·m <sup>2</sup>	2.60 ozf·in·s <sup>2</sup>
Mass (entire motor)	$m$	8.4 kg	18.48 lb
Number of Poles	—	12 poles	12 poles
Motor Diameter (actual)	AC	225 mm	8.9 in.

<sup>1</sup> Peak ratings are extrapolated based on a one-second duty cycle assuming balanced load through all three phases starting with a coil temperature of 25°C and ending with a coil temperature of 100°C.

## Efficiency (Motor Only)



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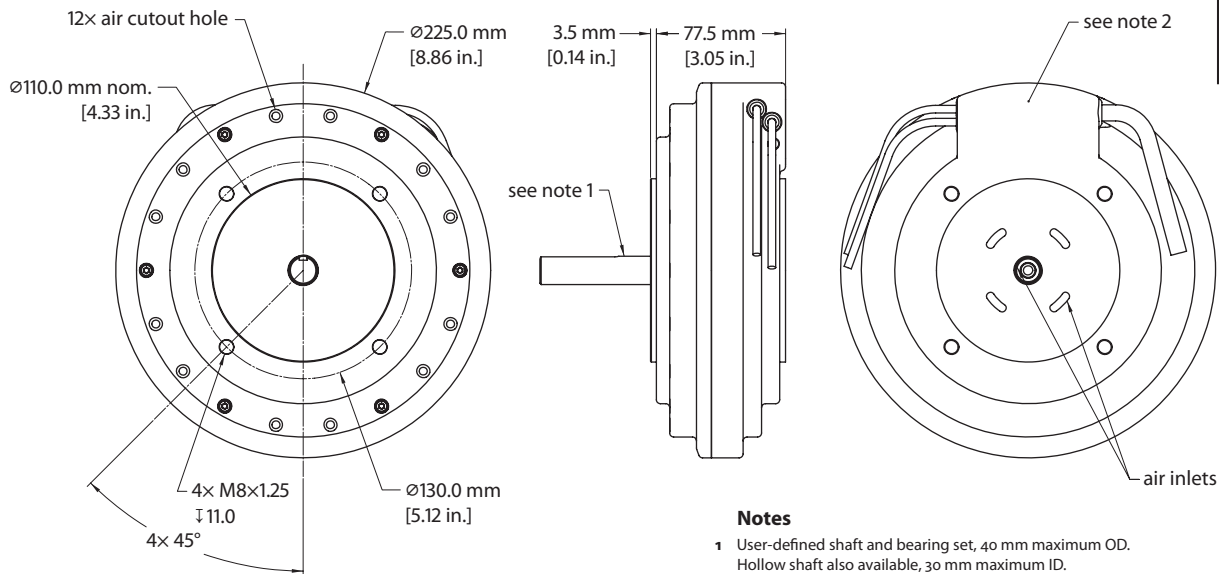
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# E225



### Notes

- 1 User-defined shaft and bearing set, 40 mm maximum OD. Hollow shaft also available, 30 mm maximum ID.
- 2 Terminating motor-power and Hall-effect cables standard. Connectors may be substituted, but will add axial length.

# S225

Parameter	Symbol	SI	English
<b>Continuous Ratings</b>			
Supply Voltage (DC bus)	$V_s$	155 V <sub>DC</sub>	155 V <sub>DC</sub>
Voltage (phase voltage H-bridge)	$V$	144 V <sub>rms</sub>	144 V <sub>rms</sub>
Speed	$S$	1,000 rpm	1,000 rpm
Torque	$T_c$	12.5 N·m	9.2 lbf·ft
Current	$I$	3.8 A <sub>rms</sub>	3.8 A <sub>rms</sub>
Power	$P_{out}$	1.3 kW	1.7 hp
<b>Peak Ratings</b>			
Peak Torque <sup>1</sup>	$T_{pk}$	66.8 N·m	49.3 lbf·ft
Peak Current <sup>1</sup>	$I_{pk}$	19.9 A	19.9 A
<b>Motor Constants</b>			
Torque Constant	$K_T$	3.36 N·m/A	2.48 lbf·ft/A
Back EMF Constant (per phase)	$K_E$	117 V <sub>rms</sub> /krpm	117 V <sub>rms</sub> /krpm
Electrical Time Constant	$\tau_e$	447 ns	447 ns
<b>Electrical Aspects</b>			
Resistance (100°C)	$R$	7.04 Ω	7.04 Ω
Inductance	$L$	3.36 mH	3.36 mH
<b>Mechanical Aspects</b>			
Inertia (rotor only)	$J_r$	18.4 g·m <sup>2</sup>	2.60 ozf·in·s <sup>2</sup>
Mass (entire motor)	$m$	8.6 kg	18.92 lb
Number of Poles	—	12 poles	12 poles
Motor Diameter (actual)	AC	225 mm	8.9 in.

<sup>1</sup> Peak ratings are extrapolated based on a three-second duration assuming balanced load through all three phases starting with a coil temperature of 25°C and ending with a coil temperature of 100°C.

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