



# NOVAMAX™ EC PERMANENT MAGNET MOTOR

THE NEXT STEP IN ELECTRIC MOTOR EFFICIENCY

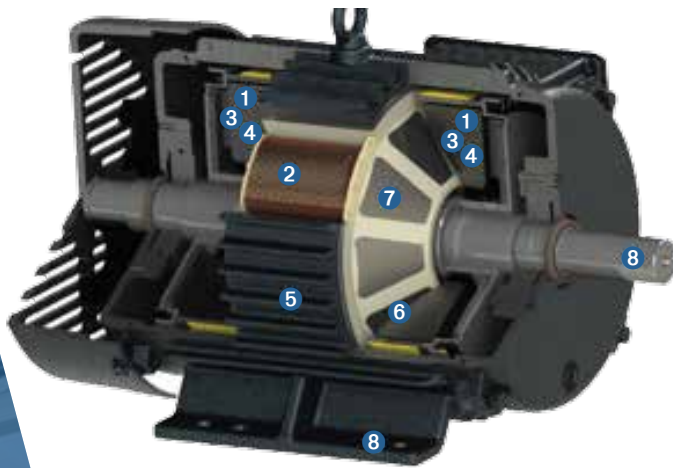
**REGAL**<sup>®</sup>

# NOVAMAX™ EC PERMANENT MAGNET MOTOR

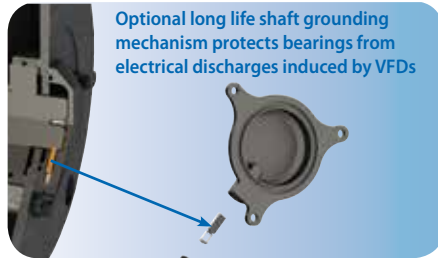
## THE NEXT STEP IN ELECTRIC MOTOR EFFICIENCY

NovaMAX™ motor's innovative conical rotor/stator geometry produces rare-earth-like motor performance using inexpensive, readily available, ferrite magnets. It is a whole new class of electric motor that provides the performance of a permanent magnet motor at a cost more similar to a premium induction motor.

NovaMAX motors offer a substantially superior energy efficiency over a broad operating range and at low speeds as well as greater power density and cooler operation.



New 182T/184TTEFC Series  
(TEAO/TENV also available)

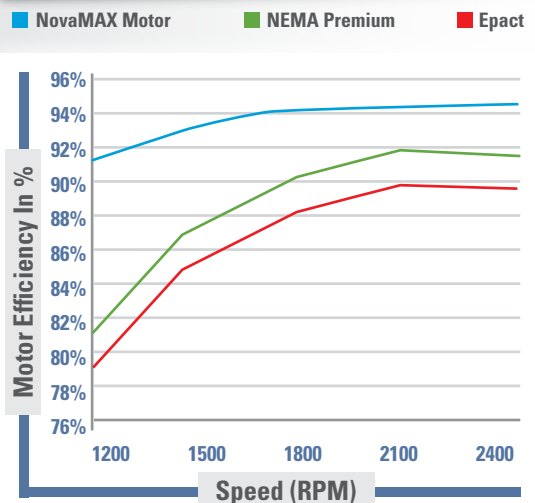


Optional long life shaft grounding mechanism protects bearings from electrical discharges induced by VFDs

# NovaMAX™

- 1 Use of permanent magnets to produce magnetic field in the rotor inherently saves energy when compared with the electrically induced magnetic field in an induction motor rotor.
- 2 Axial orientation of field poles allows for use of bobbin wound coils, eliminating the wasted material and energy associated with end turns.
- 3 Interior permanent magnets (IPM) further focus flux while increasing saliency for improved sensorless motor control.
- 4 Dual conical-shaped rotors
- 5 Due to higher efficiency, motor runs cooler, extending motor life. Additionally, due to the positioning of the windings, the heat that is generated is more efficiently dissipated.
- 6 Unique conical air gap mating of stator and rotor maximizes surface area, concentrating flux, allowing for use of ferrite (non rare earth) magnets.
- 7 Axial flux path allows for use of grain oriented steel, minimizing eddy current losses.
- 8 Standard NEMA® mounting and shaft dimensions.

## 10HP MOTOR EFFICIENCY IN A TYPICAL FAN APPLICATION



# NOVAMAX™ MOTOR APPLICATIONS

## FOR END USERS AND OWNERS

- Ongoing reduction in electricity costs – 5% to 20% reduction compared to NEMA® Premium (IE3-level) induction motors
- Rapid payback, often under one year, on a modest price premium over induction motors
- Higher efficiency results in cooler motor operating temperatures, emitting less heat into the air stream, hence further reducing cooling costs
- Maintains B temperature rise and 1.15 service factor under VFD operation. Reduced motor temperatures extend insulation and bearing life.
- Ease of substitution due to conformance with NEMA standard dimensions
- Compatibility with all leading VFD brands
- Bearing life protected by optional proprietary shaft grounding mechanism
- Utility rebate/incentive qualified (utility program dependent)
- UL listed

## FOR RESELLERS, DISTRIBUTORS, CONTRACTORS, & SPECIFIERS

- Gain competitive advantage by reducing customers' operating costs
- Assists in meeting the toughest building/equipment efficiency standards
- High efficiency maintained over broad speed range
- Ease of substitution due to conformance with induction motor form factor and standard NEMA mounting dimensions
- Compatibility with all leading VFD brands
- Bearing life protected by optional proprietary shaft grounding mechanism
- Utility rebate/incentive qualification (utility program dependent)
- UL listed

## FOR ORIGINAL EQUIPMENT MANUFACTURERS

- Cost effective means to differentiate offering and gain competitive advantage, reducing end-customer operating costs
- Expanded range of rated speeds (600, 900, 1200, 1800, 2400, and 3600) precisely matches motor design to the application, often reducing FLA requirements, hence VFD sizing, and in large installations, reducing building electrical feed requirements
- A simple, cost effective, means to meet current and future higher systems-based regulatory efficiency standards
- Alternative, NEMA frame-based, response to specifications calling for EC (Electronically Commutated) motors
- High efficiency maintained over broad speed range
- Ease of substitution due to conformance with induction motor form factor and standard NEMA mounting dimensions
- Bearing life protected by optional proprietary shaft grounding mechanism
- Compatibility with all leading VFD brands
- UL listed

NovaMAX™

## NOVAMAX™ MOTOR MODELS BY RATED POWER AND SPEED

EFFICIENCY OF NOVAMAX MOTORS BY RATED POWER AND SPEED						
Hp	600 RPM	900 RPM	1200 RPM	1800 RPM	2400 RPM	3600 RPM
3/4	92.5%	90.0%	TBD	TBD	TBD	TBD
1	92.5%	92.0%	TBD	TBD	TBD	TBD
1.5	91.5%	93.0%	92.5%	TBD	TBD	TBD
2	94.0%	<b>93.0%</b>	93.0%	93.0%	91.0%	TBD
3	93.5%	91.0%/94.5%	<b>93.5%</b>	94.0%	93.5%	91.0%
5	94.0%	<b>94.0%</b>	94.0%	94.0%	94.0%	93.0%
7.5	94.0%	95.0%	<b>93.5%</b>	95.0%	<b>93.5%/95.0%</b>	93.5%
10	TBD	<b>94.5%</b>	94.5%	95.0%	95.0%	<b>94.0%</b>
15	TBD	TBD	94.0%	95.5%	<b>94.5%/95.4%</b>	94.0%
20	TBD	TBD	TBD	95.5%	95.4%	<b>94.5%</b>
25	TBD	TBD	TBD	TBD	TBD	94.5%
30	TBD	TBD	TBD	TBD	TBD	<b>95.0%</b>

- NovaMAX 182/184 Frame
- NovaMAX 213/215 Frame
- NovaMAX 254/256 Frame

Configurations in Green are a frame size smaller than an ACI motor  
 3 Hp, 900 RPM is available in a 182/184 frame at 90% efficiency and in a 213/215 frame at 94.5% efficiency  
 7.5 Hp, 2400 RPM is available in a 182/184 frame at 93.5% efficiency and in a 213/215 frame at 95.0% efficiency

# USE OUR ONLINE SAVINGS CALCULATOR – FIND OUT HOW MUCH YOU CAN SAVE!

## NovaMAX™ Motor

Fan Operating Points	Duty Cycle	Motors / Power Cost	Savings
<b>Max Output Power (BHP):</b> <input type="text" value="20"/> <b>Max Speed (rpm):</b> <input type="text" value="3600"/> <b>Speed 2 (rpm):</b> <input type="text" value="3000"/> <b>Speed 3 (rpm):</b> <input type="text" value="2700"/>	<b>Duty Cycle Selection</b> <input type="text" value="24 hours, 7 days/wk"/> <b>Percent Time at Max Speed:</b> <input type="text" value="30"/> <b>Percent Time at Speed 2:</b> <input type="text" value="50"/> <b>Percent Time at Speed 3:</b> <input type="text" value="20"/>	<b>Motor Voltage Class</b> <input type="text" value="460 VAC, 3-Phase"/> <b>Number of Motors:</b> <input type="text" value="1"/> <b>Power Cost (\$/kW-hr):</b> <input type="text" value="0.10"/> <b>Time Interval (Months):</b> <input type="text" value="12"/>	<b>NovaMAX Motor:</b> <input type="text" value="20HP: NTQPM-29-2036-4"/> <b>AC Induction Motor:</b> <input type="text" value="20HP, 3600rpm 2-Pole"/> <b>12 Month Energy Savings (kW-hr)</b> <input type="text" value="3620.5"/> <b>12 Month Cost Savings (Dollars)</b> <input type="text" value="\$362"/>

**# Operating Points**

### Motor Efficiency Comparison

Speed (rpm)	NovaMAX Motor (%)	Premium Induction (%)
2700	~94.2	~90.8
3000	~94.5	~91.1
3600	~94.8	~91.2

## www.novamaxmotor.com

**marathon®**  
Motors

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**APPLICATION CONSIDERATIONS**

The proper selection and application of electric motor and power transmission products and components, including the related area of product safety, is the responsibility of the customer. Operating and performance requirements and potential associated issues will vary appreciably depending upon the use and application of such products and components. The scope of the technical and application information included in this publication is necessarily limited. Unusual operating environments and conditions, lubrication requirements, loading supports, and other factors can materially affect the application and operating results of the products and components and the customer should carefully review its requirements. Any technical advice or review furnished by Regal Beloit America, Inc. and/or its affiliates ("Regal") with respect to the use of products and components is given in good faith and without charge, and Regal assumes no obligation or liability for the advice given, or results obtained, all such advice and review being given and accepted at customer's risk.

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