



***Motors for the Long Run!***  
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# Variable Speed SB371 Motor Catalog

2007



"At The Heart Of What Drives Your World"



# Marathon Electric...

## The Mark of a Great Motor!



XRI® Severe Duty  
143-449T Frame



**NEMA Premium®/XRI®** - As a leading supplier of premium efficiency motors, we help conserve money and our environment. Marathon's designs are 100% compliant with CEE efficiency levels.



**ME-business** - Doing business with Marathon Electric has never been easier, with our on-line, "24/7/365" e-commerce site. Use ME-business to check order status, stock status, verify list price, invoice and shipment tracking, and a multitude of other functions designed to answer your questions promptly.



**UL Recognized** - Often, our motors are components of a larger UL Listed machine. Our long association with Underwriters Laboratories, under the Component Recognition program, ensures that Marathon's UL Recognized products form an integral part of your successful agency investigation project.



IEC Globetrotter®  
63-225M Frame



**Globetrotter®** - Marathon's IEC (metric) motor series is truly a world-class motor, meeting all IEC60034 and IEC60072 specifications. Where IEC and NEMA standards conflict, the Globetrotter meets the more stringent of the two! We offer production capability through IEC 315 frame.



**Marine Duty** - Marathon's Marine Duty motors meet the stringent product, quality and document retention specifications required for participation in the Commercial Marine industry. You'll find Marathon motors in a variety of applications, such as pumping, air handling, compressors, winches, hoists and windlasses.



**Inverter Duty** - The "Max" series of inverter/vector duty motors provides optimized, power-matched performance with today's drive technology, while meeting NEMA MG1-2003, Part 31. Marathon's general purpose, three phase motors accommodate operation from PWM power, providing a generous speed range.



Explosion Proof  
56-449T Frame



**UL Listed** - Marathon's Hazardous Duty™ motors include Division 1/Zone 1 explosion proof motors, designed for use in environments containing explosive gases or combustible dusts. The UL mark confirms that Marathon's motors have undergone rigorous testing, to ensure the user's safety.



**SpinMaster®** - The REGAL-BELOIT SpinMaster® drives range from simple, low cost speed control to advanced vector technology, in IP20, NEMA 1, NEMA 4/12 and NEMA 4X enclosures, with ratings through 60 HP.



**CE (Conformity Europeanne)** - Marathon motors are available with the CE Mark, certifying compliance with a number of European Union Directives related to product design, operation and safety.



Washdown  
PowerWash™  
56-215 Frame



**BISSC** - The "PowerWash" SXT-Plus™ stainless motors, available through 10 HP, are certified for use in the baking industry, having passed the rigorous standards required for motors used in food processing applications.



**MAX GUARD®** - This premier insulation system combines corona resistant magnet wire, a patented "Low Stress" winding technique and uncompromising quality standards, to exceed NEMA MG1-1998, Part 31, Section 4.4.2, while eliminating cable length and carrier frequency restrictions.



**CSA** - Marathon Electric works in partnership with Canadian Standards Association, to provide safe, CSA Certified products. Division 2 Hazardous Duty™ motors are Third Party Certified by CSA, while most motor manufacturers self-certify their Division 2 products.

*Our Vision...* We will clearly distinguish our products and services as the best value to our customers, as measured by our customers. We will maintain a sustainable, competitive advantage through the excellence of our people and our processes – creating value for all our stakeholders.

*Our Mission...* We will live our values, demonstrating integrity in all our actions. We will function with a high level of personal energy, energizing those around us. We will have the courage to make difficult decisions and execute to accomplish our vision.

# We Value...



**Customers** – We can be successful only when our customers are successful. We succeed by meeting their needs and exceeding their expectations. We are focused on increasing the value we provide to our customers in every aspect of our business relationships.



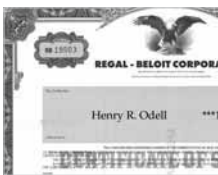
**Integrity** – Integrity is the cornerstone of all business and personal relationships. As a company and as individuals, we do the right things and never compromise our values, always conducting ourselves according to the highest standards.



**People** – Our people are our most valuable asset. We are committed to a safe workplace that values diversity and encourages our people's total energy and involvement in operating our business. We will reward our people on merit and the embodiment of our values.



**Improvement** – We are capable of great things. No matter how good our products, services, people, processes and performance, we are dedicated to making them better. We strive for excellence in everything we do by being open to new ideas and by approaching our daily work with a passion for innovation and a desire to learn and share that learning.



**Shareholders** – Shareholders provide the capital that allows our existence. We are committed to profitably growing our business, while expanding operating margins and improving the utilization of capital to provide top tier total returns to our shareholders.



**Citizenship** – We are called to give of our time, our talent and our financial resources to society and the communities that make it possible for our enterprise to exist. As a responsible corporate citizen, we are also committed to being a leader in protecting the environment. Through our stewardship, we create value for all stakeholders and preserve opportunities for generations to follow.



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**HOW TO READ A MODEL NUMBER:**

Each Marathon Electric motor carries a model number that can be used to define some of the motor's physical and electrical characteristics.

Example (For Fractional): 1PC48C17D2000AP

This is a breakdown of the model on the nameplate:

<u>1</u>	<u>P</u>	<u>C</u>	<u>48</u>	<u>C</u>	<u>17</u>	<u>D</u>	<u>2000</u>	<u>A</u>	<u>P</u>
1	2	3	4	5	6	7	10	11	12

This is a breakdown of the model in the catalog:

<u>48</u>	<u>C</u>	<u>17</u>	<u>D</u>	<u>2000</u>
4	5	6	7	10

Example (For Integral): 2QA215TBDRA7076ALL

This is a breakdown of the model on the nameplate:

<u>2</u>	<u>Q</u>	<u>A</u>	<u>215T</u>	<u>B</u>	<u>D</u>	<u>R</u>	<u>A</u>	<u>7076</u>	<u>AL</u>	<u>L</u>
1	2	3	4	5	7	8	9	10	11	12

This is a breakdown of the model in the catalog:

<u>215T</u>	<u>B</u>	<u>D</u>	<u>R</u>	<u>A</u>	<u>7076</u>
4	5	7	8	9	10

**1. Date Code** - Year of Manufacture  
(Not shown in catalog listings.)

**2. Thermal Protection** (Not shown in catalog listings.)

	UL Recognized Motor Protector Combination	UL Recognized Motor Construction
Automatic Reset	Automatic Reset	Automatic Reset
Q	Yes	Yes
S	No	No
U	No	Yes
W	#	Yes
Manual Reset	Manual Reset	Manual Reset
P	Yes	Yes
Z	No	Yes
X	No	No
None	None	None
V	No	Yes

# Motor protector combination is U.L. recognized only if motor is used in direct drive fan duty application, and is under locked rotor condition, or is running under no-load condition.

**3. Date Code** - Month of Manufacturer (Not shown in catalog listings.)

**4. NEMA Frame Size** - (Integral motors - T and U designate standard shaft, TS and US designate short shaft)

**5. Electrical Type**

Single Phase:

- A = Permanent split capacitor
- B = Capacitor start, capacitor run
- C = Capacitor start, induction run
- N = Split phase start, capacitor run
- S = Split phase

Three Phase:

- T = Three phase
- H = Inverter Duty/IEEE841 Inverter Duty
- V = Medium Voltage

DC Power:

- E = Permanent Magnet DC

**6. RPM or Speed at 60 Hz (Fractional Only)**

- 34 = 2-Pole, 3600 rpm
- 17 = 4-Pole, 1800 rpm
- 11 = 6-Pole, 1200 rpm
- 8 = 8-Pole, 900 rpm

**7. Enclosure**

- D = Dripproof
- E = Explosion proof, non-ventilated
- F = Totally enclosed, fan cooled
- G = Explosion proof, fan cooled
- O = Open
- P = Partial
- S = Semi-enclosed
- T = Totally enclosed, non-ventilated
- V = Washdown, non-ventilated
- W = Washdown, fan cooled

**8. Frame Construction**

**Integral**

- L = Aluminum (Full Frame)
- Y = Aluminum (Full Frame)
- Z = Aluminum (High Mount Down Frame)
- H = Aluminum - Sourced
- R = Rolled Steel (Full Frame)
- W = Rolled Steel (Full Frame)
- X = Rolled Steel (High Mount Down Frame)
- B = Rolled Steel - Sourced
- S = Cast Iron (Full Frame)
- N = Cast Iron (Full Frame)
- P = Cast Iron (High Mount Down Frame)
- C = Cast Iron - Sourced
- D = Stainless Steel

**Fractional**

- B = Rolled Steel - Sourced
- D = Stainless Steel Sourced
- U = Frameless - Sourced

**9. Style Letter (A, B, C, etc. indicate redesign)**

**10. Sequence Number**

**11. Minor Modification Letter(s)**  
**Fractional - 1 letter; Integral - 2 letters**

**12. Manufacturing Code** - A code for the factory where the motor was manufactured.

# General Information

## MARATHON ELECTRIC

Marathon Electric offers the most extensive line of AC Variable Speed motors in the market. From 1/8 HP microMAX to 1250 HP Blue Max® machines, our proven, performance-matched products enhance productivity with today's drive technology in virtually any variable speed application. Our state-of-the-art lab facilities are equipped and staffed with the finest resources available to ensure successful utilization of our products. Marathon Electric's unique designs provide more ways in which to add accessories, such as blowers, brakes and encoders, to our motors than anyone else in the motor business. Finally, as the preferred supplier of motors to the top drive manufacturers in North America, we have what it takes to be a leader in understanding the interaction of drives as they are applied with AC induction motors.

## ORDERING INFORMATION

When ordering, please include the model number, catalog number, description of the motor, quantity, shipping and billing instructions. For pricing of non-stock motors, or if you need assistance in selecting the proper motor, please contact your nearest Marathon Electric sales representative or local Marathon Electric Distributor. **All prices and data are subject to change without notice.**

## CANCELLATIONS AND RETURNS

### Stock Product

Stock product can be returned for credit as defined herein. Equipment must be in original packaging, unused in "as shipped" condition and is limited to products currently maintained in stock inventory. The quantity returned cannot exceed Marathon Electric's normal stock quantity level. All motors returned must have date codes no older than 18 months from date of manufacture. The minimum restocking charge is 25% of the original net purchase price. Modified and build to order motors cannot be returned for credit. Return freight charges are the responsibility of the customer returning the motor for credit.

### Non-stock Product Cancellation policy:

Cancellation charges for non-stock orders received and entered will be determined based on the percentage of completion in the engineering and manufacturing process, accounting for all costs plus a reasonable profit. Marathon Electric's determination of the cancellation charges shall be conclusive.

## DISCOUNTS AND MULTIPLIERS

Except as noted, all prices in this catalog are list prices. For your discount and multiplier, contact your local Marathon Electric sales representative or local Marathon Electric Distributor.

## MODIFICATION SECTION

See the Modification Section of this catalog for more information on modifications to create special motor variations.

## STOCK, NON-STOCK AND BUILD UP MODELS

Standard motors listed in this catalog, as indicated with a star (\*) next to the catalog number, are normally in stock. There is no minimum order quantity or minimum billing charge associated with stock motors, unless stated otherwise in your quotation or agreement with Marathon Electric.

Production of non-stock catalog models and all build-up models are subject to minimum order quantities or setup charges listed below.

48-140 Frames = 25 piece minimum

180-210 Frames = 5 piece minimum or \$200 set-up/model

250-320 Frames = 5 piece minimum or \$300 set-up/model

Build-up motors must be thoroughly described at time of order, and/or associated with a formal quotation issued by Marathon Electric. Inclusion of product features for similar motors documented in this catalog should not be assumed.

## SERVICE

For service on any Marathon Electric motor, contact your nearest Marathon Authorized Service Station. For a complete listing of all domestic and foreign service stations, refer to brochure, SB112 on our web site at [www.marathonelectric.com](http://www.marathonelectric.com).

## OPERATION AND MAINTENANCE

For information on operation and maintenance, please consult the manual or card shipped with your new motor. Additional copies of "Installation, Operation & Maintenance Instructions" (brochure SB181) are available upon request or through our web site, [www.marathonelectric.com](http://www.marathonelectric.com).

## STORAGE PROCEDURES

In the event that long-term storage of motors is required, Marathon Electric recommends the following precautions and procedures. This information is also contained in "Installation, Operation and Maintenance Instructions" (SB181).

### A. Keep motors clean

1. Store indoors
2. Keep covered to eliminate airborne dust and dirt.
3. Cover openings for ventilation, conduit connections, etc., to prevent entry of rodents, snakes, birds and insects.

### B. Keep motors dry

1. Store in a dry area indoors
2. Temperature swings should be minimal to prevent condensation.
3. Space heaters are recommended to prevent condensation.
4. Treat unpainted flanges, shafts and fittings with a rust inhibitor.
5. Check insulation resistance before putting motor into service.

**C. Keep bearings lubricated**

1. Once per month, rotate shaft several turns to distribute grease in bearings.
2. If unit has been stored more than one year, add grease before start-up (refer to lubrication procedure)

**AGENCY LISTINGS**

**UL and CSA**

Where applicable, Marathon Electric’s motors are UL Listed for explosion proof enclosures, UL Recognized construction for non-explosion proof enclosures, and UL Recognition as a motor/ protector combination. Our motors are also CSA Certified for both explosion proof and non-explosion proof enclosures.

**AC Motors**

Non-Explosion Proof	UL File No.	CSA File No.
NEMA 48-449 Frame	E49747	LR2025
NEMA 500/5000 Frame	—	LR2025*
IEC 63-90 Frame	E49747	LR2025
IEC 100-280 Frame	E49747	LR2025 <sup>Δ</sup>
*Does not include coverage for use with VFD <sup>Δ</sup> Domestic product only		
Explosion Proof	UL File No.	CSA File No.
NEMA 56-326	E12044	LR47504
NEMA 364-449	E12044	LR21839
Fire Pump motors	UL File No.	CSA File No.
NEMA 143-510 Frame	EX5190	LR2025

**PMDC Motors**

Non-Explosion Proof	UL File No.	CSA File No.
NEMA 56-145	E57948	LR33543

**CE (Conformity Europeenne)**

CE marking on the nameplates of Marathon Electric motors is available upon request. Note that only the "Low Voltage" directive applies to electric motors. Contact a factory representative for details. Non-explosion proof microMAX™, BlackMax® and BlueMax® (TENV and TEFC) standard (catalog) models have the CE Mark on the nameplate.

**ATEX Directive (Atmospheres Explosibles)**

Mandatory by law, the European Union (EU) Directive 94/9/EC requires that electric motors in contact with a potential ignition source carry the CE mark, notified body identifier, Ex symbol, equipment group and category, plus the date code.

**NEMA (National Electrical Manufacturers Ass’n)**

All Marathon Electric motors are manufactured in accordance with all applicable NEMA standards in MG1-2003. When applied in accordance with the Guidelines for Application of Three Phase Motors on Variable Frequency Drives," **Marathon Electric motors are in full compliance with NEMA MG1-2003, Part 31, Section 4.4.2**, as pertaining to voltage spikes. 460 volt motors must withstand voltage spikes of up to 1426 volts; 575 volt

motors must withstand spikes up to 1788 volts. See "Insulation Systems" for additional detail on this subject.

**Commitment to RoHS and WEEE European Directives**

European Directive 2002/95/EC “Restriction of Use of Certain Hazardous Substances” (RoHS) and Directive 2002/96/EC “Directives on Waste Electrical and Electronic Equipment” (WEEE) were enacted to control the amount of certain hazardous substances contained in products shipped into the E.U. Restricted substances include lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls and polybrominated dipheynl ethers.

The scope of products covered, affecting motors, is:

- Large household appliances
- Small household appliances
- IT and telecommunications equipment
- Consumer equipment
- Electrical and electronic tools (except large scale stationary and industrial tools)
- Toys, leisure and sports equipment
- Automatic dispensers

In addition to the exemption above, the Directives do not currently apply to medical devices, monitoring and control instruments, spare parts for the repair or reuse of electrical and electronic equipment placed on the market before July 1, 2006, and most military and state security equipment.

Regal Beloit Corporation worked closely with suppliers to assure that product falling within the scope of these directives meets the specified levels of these substances. The directives took affect July 1st, 2006 however many products were converted in May and June. The products converted are motors in NEMA frame size 145 and below, both AC and DC motors with the following exceptions:

- Sleeve bearing motors **(an exemption has been applied for). A compliant ball bearing equivalent motor can be ordered.**
- Brake motors in 56-145 frame **will have to be ordered specifically as RoHS compliant.**
- **Some motors with specialty electro-mechanical components.**

Continued on next page.

# General Information

GENERAL INFORMATION

## WARRANTY

Marathon Electric warrants Fractional and Integral motors to be free from defects in materials and workmanship and to conform to Marathon's written specifications.

Motor Type	Warranty Period from Date of Installation*	Warranty Period from Date of Manufacture*
Standard Warranty for any product not shown below	12	18
Medium Voltage**	12	18
EPA compliant (aluminum, steel & cast iron frame)	24	30
Blue Chip Severe Duty Explosion Proof	24	30
Blue Max®, Black Max®, & microMax™ Inverter Duty	36	42
All XRI® (NEMA Premium®) incl. ODP, Blue Chip, Severe Duty, Explosion Proof, etc.	36	42
U-Frame Automotive Duty	60	66
Blue Chip IEEE-841	60	66

\* Warranty period shown is in months, and is valid for whichever period expires first.

\*\* This product has an extended warranty available as long as it is being used with an electronic overload relay protection system. The warranty extension is 36 months from date of first use, not to exceed 42 months from the date of manufacture, whichever period shall expire first. This warranty extension is at no additional charge. The only requirements are the usage of the electronic relay and return of the warranty card with all items filled in. This card is attached to every Medium Voltage motor.

Note: Brake discs are considered a normal maintenance item and are not covered under warranty.

For more information, on Marathon Electric's warranty policy, refer to the "Terms and Conditions of Sale" (MPN411) in the back of this catalog.

## SUBMITTAL DATA

Mechanical and electrical submittal data is available on many stock catalog motors through our website [www.marathonelectric.com](http://www.marathonelectric.com) by following the three steps listed on the next page. All other submittal data is available upon request when accompanied by a purchase order for the specified motor, **subject to the following additional charges**

## SUBMITTAL CHARGE SCHEDULE

TYPE	ELEMENTS	NET/EA
BASIC (.PDF format)	Nameplate data Motor characteristics Performance data Outline drawing External connection diagram	No-Charge
	Add for .dxf or .dwg format	\$25
BASIC-PLUS (.pdf format)	All "BASIC" elements, tailored to specific order. "Cut sheets" of installed accessories	\$75
	Add for .dxf or .dwg format	\$25
ADDITIONAL ITEMS (.pdf formats)	Speed/Torque curve	\$50
	Torque capability curve	\$50
	Commercial (end of line) test results (not available for West Plains motors)*	\$50
	Certificate of conformance	\$100
	Thermal damage curve (48-326T frame)	\$500 + cost of additional motor
	Thermal damage curve (364T-6805 frame)	\$1500 +cost of additional motor

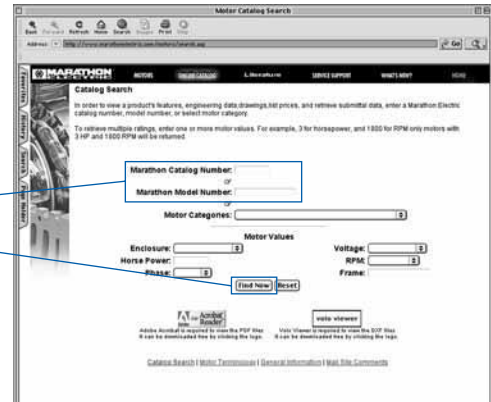
\* Does not imply retesting



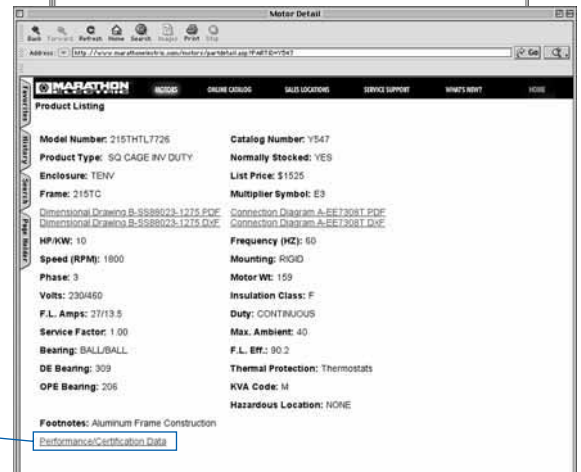
1. From our homepage, click on the link for motors. From the motors page, go to online catalog.

Enter in the Marathon Catalog number or Model number in the appropriate field. Click on Find Now.

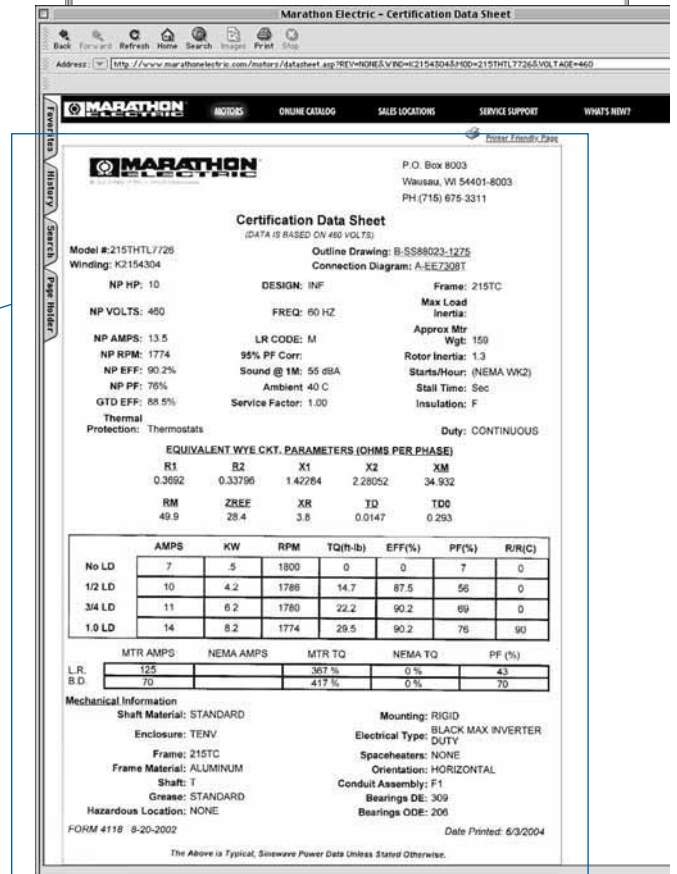
(Note: If you already have a Marathon Electric motor and are looking for the performance data, make sure the model number off the nameplate is what you use for your search. Ex. 215THTL7726).



2. A Product Listing page will appear about the motor. You will be able to print dimensional drawings and connection diagrams in PDF and DXF formats for the motors. At the bottom of this screen, click on the link, [Performance/Certification Data](#).



3. Your results will look similar to the example shown to the right for Marathon's 10 HP, Black Max® motor, model # 215THTL7726. It's that easy!



# General Information

## BEARINGS

FRAME SIZE	STANDARD TYPE	COMMENTS
48	Shielded Ball	Sleeve bearing as noted
56 - 145T	Sealed Ball	
182 - 444T	Double Shield Ball	
284 - 449TS	Single Shield Ball	
445T - 6805	Double Shield Ball	Direct - coupled loads
445T - 6805	Roller (DE)/Ball	Belted loads*

\* **Belting data must be provided on all belted applications.**

Standard horizontal motors can be mounted in a vertical shaft down orientation (except brakemotors). Contact a factory representative for shaft up mounting arrangements.

Marathon Electric motors employ the use of Mobil POLYREX® EM grease, a specially formulated bearing grease designed for electric motors. POLYREX® EM provides superior lubricity, durability and resists corrosion, rust and washout. POLYREX® EM is a registered trademark of Mobil Corporation.

Maximum safe mechanical speed capability is a function of bearing size, type and grease selection, as well as rotor balance specifications. Consult the "Maximum Safe Mechanical Speed Limits" chart in the "Overspeed Capability" section. Note that these values do not imply maximum constant horsepower RPM.

## EFFICIENCY

The efficiency of a motor is the ratio of its useful power output to its total power input and is usually expressed in a percentage. Marathon Electric offers standard, high efficient EPAAct, and premium efficient (XRI®) ratings. Standard efficiency motors may only be used on applications that are exempt from EPAAct. The high efficient motor line is in compliance with the Energy Policy Act of 1992 (EPAAct) and/or Canadian efficiencies as set by NRCAN. The XRI® line is a premium efficiency line, which exceeds mandated efficiencies of EPAAct and /or NRCAN. Unless otherwise noted, XRI® premium efficient motors in this catalog meet NEMA Premium® the newly promoted efficiency levels by NEMA and the Consortium for Energy Efficiency (CEE).

## ENCLOSURE AND METHOD OF COOLING

Marathon Electric motors are available in various enclosures; Dripproof (DP), Dripproof Force Ventilated (DPFV), Totally Enclosed Fan Cooled (TEFC), Totally Enclosed Non-Ventilated (TENV), Totally Enclosed Blower Cooled (TEBC) and Totally Enclosed Separately Ventilated (TESV). Application conditions will determine the type of motor enclosure required.

Dripproof motors have open enclosures and are suitable for indoor use and in relatively clean atmospheres. Dripproof motors have ventilating openings constructed so that drops of liquid or solid particles falling on the machine at an angle of not greater than 15 degrees from the vertical cannot enter the machine.

Totally enclosed motors are suitable for use in humid environments or dusty, contaminated atmospheres. Totally enclosed non-ventilated motors are NOT cooled by external means. Totally enclosed fan cooled motors are cooled by external means that are part of the motor but not in the internal workings of the motor. Totally enclosed air over motors are sufficiently cooled by external means, provided by the customer.

## IEC (Inherent Protection) IP Codes vs. Marathon Electric's Standard Construction

The enclosure terminology for an IEC motor is a combination of the IP (Ingress Protection) and IC (Inherent Cooling) codes. Each number in the IP code stands for a different degree of protection.

- IP12 – Dripproof
- IP22 – Dripproof with screens, or die cast aluminum bracket
- IP43 – Totally Enclosed
- IP54 – Totally Enclosed Severe Duty
- IP55 – Totally Enclosed Severe Duty with V-Ring Shaft Seals and/or "Smart Ring" rotating shaft seal and Neoprene gaskets
- IP56 – Totally Enclosed Severe Duty with rotating shaft seals (eg. Inpro/Seal VBX bearing isolator) and Neoprene gaskets

## HAZARDOUS DUTY

Hazardous Duty motors are totally enclosed (fan cooled or non-ventilated) motors designed for applications in hazardous atmospheres containing explosive gases and/or combustible dusts.

## North American installations

North American standards for electric motors generally fall into one of two divisions. Division 1 Explosion Proof motors are UL Listed in accordance with NFPA Class I (Flammable Gases) or Class II (Combustible Dusts) and Groups (gases or dusts), depending upon the atmosphere. Division 2 motors are CSA Certified and are marked similarly to Division 1 equipment. Inverter Duty motors through 449T frame are CSA Certified for use in Division 2 locations.

## European installations

Motors for hazardous locations in Europe must meet a different set of standards and require different markings than those of North America. CENELEC sets the standards for equipment in hazardous locations for Europe. Motors for explosive atmospheres in Europe are often referred to as flameproof or non-sparking motors. These motors must comply with the ATEX Directive. The ATEX Directive covers all electrical equipment used in explosive atmospheres. To ensure compliance with the Directive, equipment must meet the essential ATEX requirements and carry the CE mark on the nameplate. Other information required on the nameplate is the Ex symbol, group & category, date code, EEx, protection method, gas group, and temperature code. (Example: EEx d IIB T4 CE0359 Ex II 2 G/D 2004)

**The tables on the next page describe Marathon Electric's capabilities by Area Classification and by Temperature Code.**

Marathon Electric Hazardous Duty Motor Area Classification Chart

Class I Area Classification (Flammable Gases, Vapors or Mists)				Class II Area Classification (Combustible Dusts)			
North America		Europe - ATEX (Category G - Gases)		North America		Europe - ATEX (Category D - Dusts)	
Division 1 Explosion Proof	Division 2 TEFC & TENV	Zone 1 Flameproof	Zone 2 Non-Sparking	Division 1 Explosion Proof	Division 2	Zone 21 Flameproof	Zone 22 Non-Sparking
Group A ①	Group A	Group IIC, Category G ①	Group IIC, Category G	-	-	-	-
Group B ①	Group B	Group IIC, Category G ①	Group IIC, Category G	-	-	-	-
Group C	Group C	Group IIB, Category G	Group IIB, Category G	-	-	-	-
Group D	Group D	Group IIA, Category G	Group IIA, Category G	-	-	-	-
-	-	-	-	Group E ①	-	-	-
-	-	-	-	Group F	Group F ①	Category D	-
-	-	-	-	Group G	Group G ①	Category D	-

- Group is not applicable to that Division or Zone, or is not defined.
- ① Group is not available from Marathon Electric.

Marathon Electric Hazardous Duty Motor Temperature Code Chart

	TEMPERATURE CODES		Division 1 Explosion Proof/Zone 1 Flameproof		Division 2/Zone 2 Non-Sparking
			Class I Area Classification (Flammable Gases, Vapors or Mists)	Class II Area Classification* (Combustible Dusts)	Class I Area Classification (Flammable Gases, Vapors or Mists)
Temp.	UL/CSA	ATEX	Division 1/Zone 1	Division 1/Zone 21	Division 2/Zone 2
280°C	T2A	T2(280)	Explosion Proof - Class I, Group D (Group C as noted)		
260°C	T2B	T2(260)			XRI® Severe Duty & IEEE-841 @ 1.15 S.F., Sine Wave Powered, Class I, Groups A,B,C,D
215°C	T2D	T2(215)			Available through Marathon's Mod Central on Totally Enclosed EPAct, XRI®, XRI® Severe Duty or IEEE-841 @ 1.0 S.F. on PWM VFD, Class I, Groups A, B, C, D
200°C	T3	T3			Available through Marathon's Mod Central on Totally Enclosed EPAct, XRI®, XRI® Severe Duty or IEEE-841 @ 1.0 S.F. Sine Wave Power, Class I, Groups A, B, C, D
165°C	T3B	T3(165)	Explosion Proof - Class I, Group D (Group C as noted) Sine Wave or PWM Powered	Explosion Proof - Class II, Groups F & G, Sine Wave or PWM Powered	
160°C	T3C	T3(160)	Available through Marathon's Mod Central on Explosion Proof - Class I, Group C & D @ 1.0 S.F. - Contact Factory	Available through Marathon's Mod Central on Explosion Proof - Class I, Group F & G @ 1.0 S.F. - Contact Factory	
135°C	T4	T4	ATEX compliant motors	ATEX compliant motors	

\* Class II, Division 2 motors are not available from Marathon Electric, Zone 22 groups are not defined by ATEX.

## INSULATION SYSTEMS

**Class B** – General Purpose motors that employ Class B insulation systems have a total temperature rating of 130°C and maximum allowable temperature rise of 80°C at 1.0 S.F.

**Class F** – Motors with a Class F system have a total temperature rating of 155°C, with a maximum temperature rise of 105°C at 1.0 S.F. Most Marathon Electric designs utilize a Class F system but limit temperature rise to no higher than "B" rise, providing thermal "headroom" for longer insulation life.

**Class H** – Class H insulated motors have a total temperature rating of 180°C and maximum allowable temperature rise of 125°C. All Marathon Electric motors that employ a Class H system are designed to operate between "B" and "F" rise, giving the user a generous thermal cushion.

**"CR<sup>200</sup>"** – Corona Resistant, 200° rated magnet wire is utilized in numerous general purpose and inverter duty motor designs to extend insulation life under the rigors of steep fronted voltage spikes, common with today's IGBT inverters. Refer to page 14 for product lines that employ the use of CR<sup>200</sup> magnet wire. Motors with the CR<sup>200</sup> insulation system can be operated at up to 475 feet from the drive on 460 volt systems, at 3 KHz carrier frequency.

**MAX GUARD®** – All Black Max®, Blue Max®, XRI® Severe Duty, and XRI®-841 (IEEE841) motors feature the MAX GUARD® insulation system, either in conjunction with Class F or Class H materials. Combining corona-resistant magnet wire (CR<sup>200</sup>) with our patented "low stress" winding configuration and uncompromising quality standards, MAX GUARD® delivers long, dependable motor life under the adverse thermal and dielectric stresses imposed by IGBT-based variable frequency drives. Motors that employ the MAX GUARD® system can be operated at any cable length and/or carrier frequency. MaxGuard® surpasses the requirements of NEMA MG1-2003, Part 31, Section 4.4.2.

## VARIABLE SPEED INFORMATION

Marathon Electric Vector-Duty and Inverter-Duty motors, unless otherwise stated, are rated for continuous operation throughout the rated speed range (except as noted) in a 40°C ambient and for altitudes up to 3300 feet (1000 meters) above sea level. Special application considerations, such as high or low ambient, intermittent ratings, high altitude, duty cycle rated, extended constant horsepower range, special base speed, voltage or frequency, or any other special requirements, should be reviewed by a factory representative.

It is the responsibility of the startup personnel during commissioning of the VFD/motor system to properly tune the drive to the motor for the specific application. The correct voltage boost and volts/hertz settings are application dependent and

unique to each motor design. Procedures for these adjustments are in your VFD user manual. Many Vector Duty and Inverter Duty motors in this catalog are equipped with thermostats; warranty coverage may be denied if they are not properly utilized.

**⚠ WARNING** *Power factor correction capacitors should never be installed between the drive and the motor.*

## INVERTER DUTY

"Inverter Duty" (often called "Inverter Rated") motors are suitable for use with Variable Frequency Drives, as long as operation is within the application guidelines published in this catalog. In general, Marathon Electric's three phase, general purpose, NEMA Design B motors are considered "Inverter Duty", and meet or exceed the requirements of NEMA MG1, Part 30. As required under Federal law, these motors comply with EPC efficiencies when operating from utility power.

Many of Marathon's motor product lines have been enhanced to facilitate reliable operation on today's variable speed drives, including wider constant torque speed range (up to 20:1) and improved insulation systems that withstand voltage spikes common with variable frequency operation.

Inverter Duty (Rated) motors are most often used in 10:1 speed range, variable torque or constant torque applications. A vector control is usually required for operation beyond 10:1 CT.

Refer to "Guidelines for Application of General Purpose, Single Speed Three Phase Motors on Variable Frequency Drives" in this section of this catalog for the allowable speed range and cable length restrictions (from VFD to motor). Additional detail regarding a specific product's capabilities is available on its catalog page, or by consulting your application engineer.

**VECTOR DUTY** – "Vector Duty" describes a class of motors that are used in conjunction with Open- (without encoder) or Closed-Loop (with encoder) Vector controls, that provide enhanced performance under low speed operating conditions, or in cases where torque (rather than speed) must be controlled. "Vector Duty" motors can be applied to Volts/Hertz drives, as well.

Marathon Electric's "MAX" family, consisting of Blue Max®, Black Max® and microMAX™ motors, have been specifically designed for optimal operation on vector or volts/hertz controls. These motors feature a wide constant torque (up to 2000:1) and/or constant horsepower (up to 4:1) speed range and are performance-matched to all current technology IGBT drives. Vector Duty motors meet or exceed the requirements of NEMA MG1, Part 31, and are equipped with an enhanced insulation system (MAX GUARD® or CR<sup>200</sup>) to provide many years of trouble-free service. Consult the catalog page for each product's capabilities and features. As these motors are specifically designed for operation through an inverter, they are exempt from EPC legislation. Model numbers contain the letter "H" in the "Electrical Type" field.

**VARIABLE TORQUE LOADS** – Applications include fans, blowers and centrifugal pumps. Torque varies as the square of the speed, and horsepower as the cube of the speed. Operation below base speed significantly lightens the load on the motor. While most variable torque applications do not require the motor to operate below half speed, the motor is fully capable of operation to zero speed. Operation above base speed significantly adds to the load on the motor; therefore, a factory representative must review applications requiring variable torque above base speed. Refer to the application chart found on page 14 for use of general purpose three phase motors on variable frequency drives. Marathon’s microMAX™, Black Max® or Blue Max® motors are not necessarily required for operation of variable torque loads. A bypass circuit is often employed in Variable Torque applications. If this device is intended to be used, selection of a NEMA Design B motor is recommended, to withstand the inrush current during across-the-line starting.

**CONSTANT TORQUE LOADS** – Applications include conveyors, elevators, hoists, extruders, positive displacement pumps, mixers and converting equipment. Torque remains constant throughout the range of operation, and extra care should be taken in the proper application of motors, especially at very low speeds. Most constant torque (C.T.) applications don’t require operation below 10:1 (i.e. 6 Hz operation on a 60 Hz motor), but an increasing number of applications historically reserved for servo and/or stepper systems are being served with motors capable of operation beyond 20:1...even up to 2000:1 (zero speed, constant torque). Refer to the application chart found on page 14 for use of general purpose three phase motors on variable frequency drives.

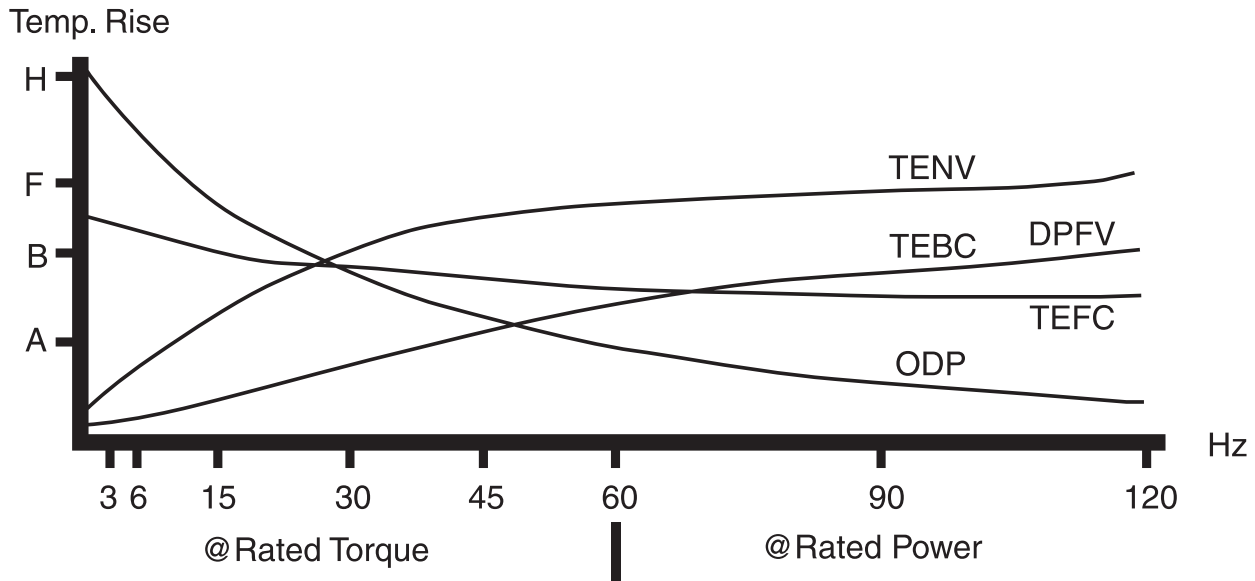
Applications requiring greater than 20:1 C.T. are ideal for microMAX™, Black Max® or Blue Max® motors. These motors provide full rated torque within their listed speed range, without exceeding a Class F temperature rating while under inverter power (many operate at Class B). Ratings in this catalog have been developed, based on extensive testing on IGBT inverters, set at a minimum 3 KHz (or equivalent) carrier frequency.

Vector Duty and Inverter Duty motors from Marathon Electric are designed for operation at 150% of rated load for one minute, up to the base speed of the motor (overload capability declines to 100% as the motor reaches maximum constant HP speed). These motors accommodate constant horsepower operation to 1-1/2 to 4 times base speed, subject to the motor’s maximum safe mechanical speed limit. Refer to the “Maximum Safe Mechanical Speed” chart, as well as the performance section for each motor’s capability.

Motors rated for zero RPM continuous duty (1000:1 or 2000:1) must be powered by vector drives to produce rated torque without overheating. Optimum zero speed and low-speed full torque performance may require a closed loop vector drive (with encoder feedback).

Continued on next page.

## Typical Temperature Rise Of Various Enclosures



**Constant Horsepower loads** – Applications include coil winders, band saws, grinders, and turret lathes. Operation requires the motor to deliver the same horsepower rating, regardless of shaft speed. Torque increases at low speed and decreases at higher speed. Most general purpose motors can deliver constant horsepower up to 1 1/2 times base speed (consult a factory representative to verify performance). However, many constant HP applications require operation to twice base speed, and some, such as coil winders, up to 4 times base speed. microMAX™, Black Max® and Blue Max® motors are designed for 1 1/2 to 2 times base speed, and the Wide CHP motors, deliver up to 4 times constant horsepower performance.

**Bearing Currents** - As stated in NEMA MG1-31.4.4.3, to protect a motor from inverter-sourced shaft voltages, either both bearings must be insulated or the motor shaft must be effectively grounded. Marathon Electric offers several effective means to protect the bearings from inverter sourced EDM (electrical discharge machining). A shaft grounding device is standard on Marathon’s Blue Max® motors, in frame sizes 444T and larger. Insulating the motor bearings will not prevent damage to bearings of a connected load, and insulated couplings should be employed to protect the load. Adding a ground brush to a motor with insulated bearings will divert motor shaft currents and help protect the bearings of the connected load. At this time, UL policy prohibits the use of ground brushes or insulated bearings in Hazardous Locations (Div 1 & 2, Zones 1, 2, 21 & 22).

**Motor Grounding** - Frames and accessories of all motors must be grounded in accordance with the National Electric Code (NEC) Article 430. Refer to NEC Article 250 for general information on grounding. Proper grounding of inverter-driven motors is essential to protect personnel and livestock from

inverter-sourced common mode voltages, which may reach hazardous levels on the frame of ungrounded or poorly grounded motors.

**Low Input Voltage** – If, due to lower utility supply voltage, the input voltage from the VFD to the motor is lower than the motor’s rated voltage, de-rating of the motor’s base frequency, horsepower, full load RPM, and constant HP RPM is required. The revised values can be calculated by multiplying by the ratio of the voltage change. For example, to operate a 460 volt motor from an inverter fed by 50 or 60 HZ, 400 volt utility power, the multiplier is 400/460 or 0.87. The VFD can be reprogrammed to match the new base point values, allowing the motor to provide rated torque at rated current from the new base speed down to its original minimum Constant torque speed. The motor’s CHP range will begin at the new base frequency and will be shortened by the same ratio as described above.

See the 40HP example below:

40HP Motor	VFD Input (460V Motor)			VFD Input (575V Motor)		
Parameters	460V	400V	208V	575V	400V	208V
Multiplier	1	.87	.45	1	.69	.36
Base HP	40	35	18	40	27.5	14.5
Base RPM	1780	1549	801	1780	1228	644
Base Freq.	60	52.2	27	60	41.4	21.7
FL Amps	47.5	47.5	47.5	37.6	37.6	37.6
Min CT RPM	70	70	70	70	70	70
Max CHP RPM	2678	2330	1205	2678	1848	969

Continued on next page.

**Other Application Considerations** – For proper selection, the following should be considered:

- Horsepower or torque requirements at various speeds.
- Desired speed range of the load and motor.
- Acceleration and deceleration rate requirements of the process being controlled.
- Starting requirements including the frequency of starting and a description of the load (reflected inertia at the motor, load torque during starting).
- Whether the application is a continuous process or duty cycle of starts, stops and speed changes.
- A general description of the type of application including the environment in which the VFD system components must operate (determines motor enclosure and/or Hazardous Location classification).
- Description of the available electrical power supply and wiring.
- Special performance requirements, if any.
- Whether the drive will be configured with a by-pass circuit. In case of its deployment, the motor will operate like its fixed speed counterpart and may require a NEMA B design which limits in-rush current, or selection of a larger motor starter or other protective circuitry.
- Load sharing
- Mounting and other mechanical considerations

**OVERSPEED CAPABILITY**

Maximum safe mechanical speed capability is a function of bearing size and type, lubrication, rotor balancing technique and specifications, air gap, enclosure, frame construction and connection to the driven load. In addition, consideration must be given to ambient noise levels, as operation above base speed will increase motor noise and vibration and reduce bearing life. Under no circumstances should bearing hub temperature exceed 100° C. Belted loads should not exceed 60 Hz operating RPM by more than 25% (NEMA "TS" shafts are not suitable for belted loads). Due to external cooling fans, TEFC (and Explosion Proof Fan Cooled) motors are limited to 4000 RPM maximum speed.

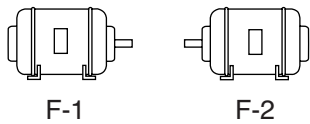
Marathon Electric, through extensive testing in our state-of-the-art laboratory and in actual field experience, has developed a number of high speed motors whose maximum safe mechanical speed exceeds the values in the table below. Contact a factory representative for details.

The following table depicts maximum safe speed limits for continuous operation, direct-coupled, non-explosion proof motors, and does not imply constant horsepower capability. Please consult a factory representative for requirements beyond those listed, or for intermittent duty limits.

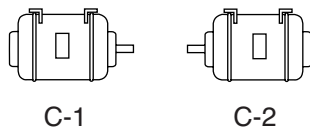
Maximum Safe Mechanical Speed Limits for ODP, TENV, DPFV and TEBC enclosures (60 Hz base frequency).

Frame Size	2-Pole	4, 6 or 8-Pole
56-184	7200	5400
213-256	5400	4200
284-286	5400	3600
324-326	4500	3600
364-365	4500	2700
404-449	3600	2700
5000 Fr	N/A	CALL
6800 Fr	N/A	CALL

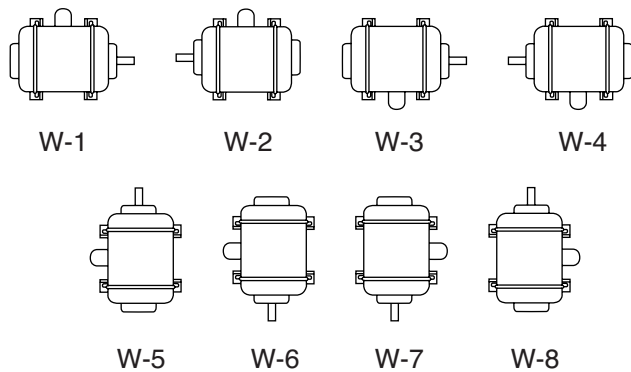
**FLOOR MOUNTING ASSEMBLIES**



**CEILING MOUNTING ASSEMBLIES**



**WALL MOUNTING ASSEMBLIES**



# Variable Speed Operation

**Guidelines for Application of General Purpose, Three Phase, Single Speed Motors on Variable Frequency Drives. Meets NEMA MG1-2003 Part 30 and Part 31 Section 4.4.2. Unless stated otherwise, motor nameplates do NOT include listed speed range.**

ENCLOSURE	EFFICIENCY	VARIABLE TORQUE	CONSTANT TORQUE								
		ALL FRAMES	56	143-215		254-286		324-365		404-449	
NEMA Motors		ALL POLES	ALL POLES	2-Pole	4&6 Pole	2-Pole	4&6 Pole	2-Pole	4&6 Pole	2-Pole	4&6 Pole
ODP	Standard (EPAAct exempt)	10:1	2:1	2:1	2:1	Contact Engineering					
	EPAAct compliant	10:1	N/A	2:1	2:1	2:1	2:1	Contact Engineering			
	NEMA Premium (XRI)	10:1	N/A	10:1	10:1	10:1	10:1	10:1	10:1	2:1	2:1
TEFC	Standard (EPAAct exempt)	10:1	2:1	2:1	2:1	Contact Engineering					
	EPAAct compliant	10:1	N/A	2:1	10:1	2:1	10:1	2:1	2:1	2:1	2:1
	NEMA Premium (XRI)	10:1	N/A	2:1	20:1	2:1	20:1	2:1	20:1 (1)	2:1	20:1 (1)
TENV	EPAAct compliant	10:1	N/A	1000:1	1000:1	1000:1	1000:1	1000:1	1000:1	1000:1	1000:1
	NEMA Premium (XRI)	10:1	1000:1	1000:1	1000:1	1000:1	1000:1	1000:1	1000:1	1000:1	1000:1
Washdown TEFC	Standard (EPAAct exempt)	10:1	10:1 (2)	10:1 (2)	10:1 (2)	N/A	N/A	N/A	N/A	N/A	N/A
	EPAAct compliant	10:1	N/A	10:1 (2)	10:1 (2)	N/A	N/A	N/A	N/A	N/A	N/A
Washdown TENV	Standard (EPAAct exempt)	10:1	1000:1	1000:1	1000:1	N/A	N/A	N/A	N/A	N/A	N/A
	EPAAct compliant	10:1	N/A	1000:1	1000:1	N/A	N/A	N/A	N/A	N/A	N/A
Explosion Proof	All efficiency levels	Explosion Proof motors must be properly nameplated with inverter duty information prior to use on VFD. See Marathon catalog pages for specific rating capabilities. Motors with automatic overload protectors cannot be used on VFDs.									
IEC Motors		ALL FRAMES	63-90	100-225							
All Enclosures	All efficiency levels	10:1	20:1	Up to 20:1							

Notes: (1) 324-449T, 4 & 6 Pole XRI motors are rated for 20:1 C.T. with fan modification; otherwise rated for 2:1 C.T. continuous or 20:1 C.T. 60 minute duty at lowest RPM.  
 (2) Washdown TEFC motors are rated for 10:1 C.T. 60 minute duty or 2:1 C.T. continuous duty at lowest RPM.

## Application Notes

Bearing currents	Marathon Electric recommends that any motors used with Variable Frequency Drives be equipped with suitable means to protect the motor bearings from shaft currents caused by common mode voltages inherent with operation on a non-sinusoidal power supply. Marathon Electric offers several options for motors in non-classified (non-hazardous) locations, including ground brushes, insulated bearings and non-contact shaft grounding rings. For more information on ground brushes and bearing currents, see the VARIABLE SPEED OPERATION section. For installation cost and available options, see the MOD CENTRAL section.
Restricted use	DO NOT APPLY THE FOLLOWING MOTORS ON VARIABLE FREQUENCY DRIVES: Single Phase motors, Motors with inherent overload protection, Multi-Speed motors, Motors with 1.0 Service Factor on sine wave power.
Hazardous Locations	Consult with Marathon Electric when applying motors and drives into Hazardous Locations, either Division/Zone 1 or Division/Zone 2 areas. UL and CSA policies prohibit the installation of bearing protection devices, such as shaft grounding brushes, rings or insulated bearings on motors in Hazardous Locations.

## Maximum Cable Lengths from the Motor to Drive

PRODUCT DESCRIPTION	3 HKz CARRIER FREQUENCY (PHASE TO PHASE)*		
	230 VOLT	460 VOLT	575 VOLT
56-326 NEMA, 100-225 IEC Frames	600 ft.	125 ft.	40 ft.
364-5013 NEMA, 250-315 IEC Frames	1000 ft.	225 ft.	60 ft.
Motors with CR <sup>200</sup> Corona Resistant Magnet Wire	1500 ft.	475 ft.	140 ft.
Motors with MAX GUARD <sup>®</sup> insulation system	Unlimited	Unlimited	650 ft.
Form-wound low voltage motors	Unlimited	Unlimited	650 ft.

\* Higher carrier frequencies require shorter cable length to obtain normal (50Khrs) insulation life.

## Standard Motor Insulation Systems

CR200 CORONA-RESISTANT MAGNET WIRE	Max Guard
microMAX inverter duty	Black Max Vector Duty
"4 - in - 1" Three Phase, C-Face with Removable Base	Blue Max Vector Duty
Standard Three Phase stock Brakemotors	Three Phase PowerWash XT and SXT washdown
Blue Chip Severe Duty Explosion Proof	Blue Chip XRI-SD and XRI-841
	Automotive Duty "T" Frame
	Blue Chip Explosion Proof, XRI Premium Efficiency
	Globetrotter IEC Metric motors



**TERMINOLOGY**

**Ambient Temperature** – Temperature of the medium, such as air, water or earth, into which the heat of the equipment is dissipated.

**Ampere (AMP)** – A measure of the rate of current through the motor.

**Base Speed** – Nameplate rating where the motor will develop rated HP at rated load and voltage. With AC systems, it is commonly the point where 60 Hz is applied to the induction motor.

**Breakaway Torque** – The torque required to start a machine from standstill.

**Breakdown Torque (BDT)** – The maximum torque that an AC motor will develop with rated voltage applied at rated frequency while rotating.

**Cogging** – A condition in which a motor does not rotate smoothly but "steps" or "jerks" from one position to another during shaft revolution. Cogging is most pronounced at low motor speeds and can cause objectionable vibrations in the driven machine.

**Continuous Duty** – The continuous rating is the maximum constant load that can be carried continuously without exceeding established temperature rise limitations under prescribed conditions of load and within the limitations of established standards.

**Definite Purpose Motor** – Any motor design, listed and offered in standard ratings with standard operating characteristics and mechanical construction, for use under service conditions other than usual or for use on a particular type of application (NEMA).

**Duty Cycle** – The relationship between the operating and resting times or repeatable operation at different loads and/or speeds.

**Efficiency** – Ratio of power output to power input indicated as a percentage. In motors, it is the effectiveness with which a motor converts electrical power into mechanical power.

**Full Load Torque (FLT)** – The torque necessary to produce rated horsepower at full load speed.

**General Purpose Motor** – This motor has a continuous duty rating and NEMA A or B design, listed and offered in standard ratings with standard operating characteristics and mechanical construction for use under usual service conditions without restriction to a particular application or type of application (NEMA).

**Inertia** – A measure of a body's resistance to changes in velocity, whether the body is at rest or moving at a constant velocity. The velocity can be either linear or rotational. The moment of inertia ( $WK^2$ ) is the product of the weight (W) of an object and the square of the radius of gyration ( $K^2$ ). The radius of gyration is a measure of how the mass of the object is distributed about the axis of rotation.  $WK^2$  is usually expressed in units of lb-ft<sup>2</sup>.

**Intermittent Duty** – A motor that never reaches equilibrium temperature, but is permitted to cool down (to ambient temperature) between operations. For example, a crane, hoist or machine tool motor is often rated for 15, 30 or 60 minute duty.

**Load Sharing** – An application condition in which two or more similar-sized AC induction motors are mechanically connected to each other and powered from the same inverter. Optimum load sharing is achieved with higher slip (NEMA Design B or C) motors.

**Locked Rotor Current (LRA)** – Steady state current taken from the line with the rotor at standstill, at rated voltage and frequency. This is the current when starting the motor and load across the line.

**Locked Rotor Torque (LRT)** – The minimum torque that a motor will develop at rest for all angular positions of the rotor, with rated voltage applied at rated frequency.

**No Load (Conditions)** – The state of a machine rotating at normal speed under rated conditions, but when no output is required from it.

**Power Factor** – Power factor is the ratio of real power (kW) to total kVA, or the ratio of actual power (W) to apparent power (volt-amperes).

**Reactance** – The opposition to the flow of current made by an induction coil or a capacitor. Performance data expresses stator reactance as X1 and rotor reactance as X2.

**Resistance** – The opposition to voltage or current in an electrical circuit. Performance data expresses stator resistance as R1 and rotor resistance as R2.

**Rotor** – The rotating member of a machine with a shaft.

Continued on next page.

## TERMINOLOGY (Cont.)

**Service Factor (SF)** – When used on a motor nameplate, a number which indicates how much above the nameplate rating a motor can be loaded intermittently without causing serious degradation (i.e. a motor with 1.15 SF can produce 15% greater torque than one with 1.0 SF, within temperature constraints).

**Shock Load** – The load seen by a clutch, brake or motor in a system that transmits high peak loads. This type of load is present in crushers, separators, grinders, conveyors, winches and cranes.

**Slip** – The difference between the speed of the rotating magnetic field (synchronous speed) and mechanical rotational speed (rotor speed) of AC induction motors. Usually expressed as a percentage of synchronous speed.

**Special Purpose Motor** – A motor with special operating characteristics, special mechanical construction, or both, designed for a particular application and not falling within the definition of a general purpose or definite purpose motor (NEMA).

**Speed Range** – The minimum and maximum speeds at which a motor must operate under constant or variable torque load conditions. A 50:1 speed range for a motor with top speed of 1800 RPM means the motor must operate as low as 36 RPM and still operate within specifications.

**Starting Torque** – The torque exerted by the motor during the starting period.

**Stator** – The stationary portion of the magnetic circuit and the associated windings and leads of a rotating machine.

**Synchronous Speed** – The speed of an AC induction motor's rotating magnetic field. It is determined by the frequency applied to the stator and the number of magnetic poles present in each phase of the stator windings. Mathematically, it is expressed as Sync Speed (RPM) = 120 x Applied Frequency (Hz)/Number of Poles per phase.

**Torque** – A turning force applied to a shaft, tending to cause rotation. Torque is normally measured in "pound-feet" and is equal to the force applied times the radius through which it acts.

**Torque-to-Inertia Ratio** – The rated motor torque divided by its rotor inertia. Helps determine a motor's ability to accelerate loads and/or respond to commands from a drive to change speed or direction.

## FORMULAS & CONVERSION FACTORS

$$\text{Torque (lb-ft)} = \frac{\text{HP} \times 5250}{\text{RPM}}$$

$$\text{HP} = \frac{\text{Torque (lb-ft)} \times \text{RPM}}{5250}$$

$$\text{Synchronous RPM} = \frac{120 \times \text{Frequency}}{\# \text{ Poles}}$$

$$\text{Ohms} = \text{Volts} / \text{Amperes} (R = E/I)$$

$$\text{Amperes} = \text{Volts} / \text{Ohms} (I = E/R)$$

$$\text{Volts} = \text{Amperes} \times \text{Ohms} (E = IR)$$

$$\text{Newton-meters (torque)} = 1.3558 \times \text{lb-ft}$$

$$\text{Pound-feet (torque)} = .7376 \times \text{Newton-meters}$$

$$\text{Horsepower} = 746 \text{ watts} (.746 \text{ KW})$$

$$\text{Kilowatts (KW)} = 1.341 \times \text{Horsepower}$$

$$\text{Temperature (° Celsius)} = 5/9 \times (°\text{F} - 32)$$

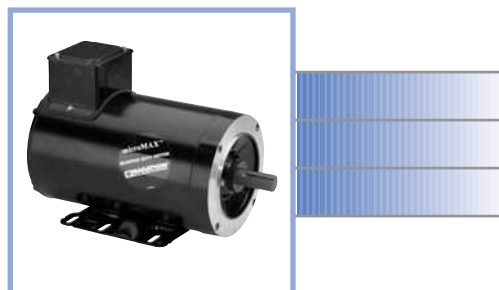
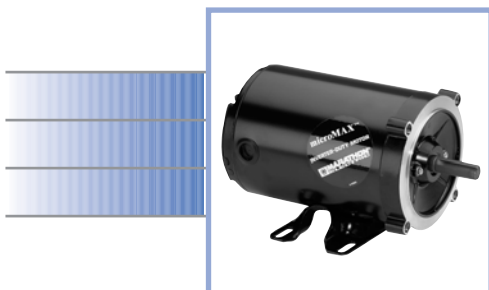
$$\text{Temperature (° Fahrenheit)} = (9/5 \times °\text{C}) + 32$$

# microMAX™ AC Inverter Duty Motor

## 1000:1 Constant Torque (TENV)

## 20:1 Constant Torque (TEFC)

### C-Face and C-Face with Rigid Base



**Applications:** microMAX™ motors are designed as a replacement motor technology for PMDC systems, multi-speed motors, single phase and as a variable speed upgrade from standard fixed speed motor systems. Uses include machine tool, conveyors, paint sprayers, metering pumps, indexing machines, packaging equipment, food and beverage machinery, printing equipment, floor machines, and treadmills.

- Features:**
- Replaces 90 and 180 volt PMDC motors, when utilizing AC micro drives
  - Class H insulation with CR<sup>200</sup> (*corona resistant*) magnet wire
  - Constant torque operation from 0 to base speed (*TENV ratings*)
  - Constant torque operation from 1/20 speed to base speed (*TEFC ratings*)
  - Constant horsepower operation to twice base speed
  - Rolled steel frame construction
  - No brushes or commutators to replace or maintain
  - "Quick Connect" terminal board (*single voltage TENV ratings, except 1.5 HP*)
  - Top mount conduit box (*TEFC ratings*)
  - Low operating temperature (*Class "B" rise or lower*)
  - UL Recognized, CSA Certified and CE Marked
  - Three year warranty
  - No encoder provisions

- Stock Ratings:**
- 1/8 - 1-1/2 HP, 1800 RPM, 230 Volt
  - 1/2 - 10 HP, 1800 RPM, 230/460 Volt
  - 1 and 2 HP, 1800 RPM, 575 Volt

# microMAX™ AC Inverter Duty Motor

## 1000:1 Constant Torque (TENV)

## 20:1 Constant Torque (TEFC)

C-Face with Rigid Base and C-Face with Removable Rigid Base



**Applications:** Designed for direct replacement of PMDC or any other variable speed application where up to a 1000:1 constant torque speed range is required. Typical uses include: machine tools, conveyors, packaging machines, batching machines, and printing equipment.

- Features:**
- Replaces 90 volt and 180 volt PMDC motors (when used with AC variable frequency drives)
  - Constant torque operation from 0 to base speed (TENV ratings)
  - Constant torque operation from 1/20 speed to base speed (TEFC ratings)
  - Constant horsepower to twice base speed (RPM)
  - Class H insulation with CR<sup>200</sup> magnet wire
  - Removable base for C-Face footless mounting (as noted)
  - Continuous duty at 40°C ambient
  - "Quick Connect" terminal board (as noted)
  - Top mounted conduit box with pigtail leads (TEFC and 1.5 HP TENV)
  - Eliminates brush and commutator maintenance
  - UL Recognized, CSA Certified and CE Marked
  - Three year warranty
  - No encoder provisions

See performance and dimensions pages 19-20.

HP	RPM	VOLTS	ENCL.	FRAME	CAT NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	F.L. AMPS	APPROX.. WGT. LBS.	"C" DIM.	FOOT NOTES
1/8	1800	230	TENV	56C	Y605	56H17T2021	\$220	E3	0.7	18	9.05	Q
1/4	1800	230	TENV	56C	Y500*	56H17T2011	\$238	E3	1.0	18	9.80	Q
1/3	1800	230	TENV	56C	Y502*	56H17T2013	\$256	E3	1.2	18	9.80	Q
1/2	1800	230	TENV	56C	Y504*	56H17T2015	\$301	E3	1.8	20	10.55	Q
	1800	230/460	TENV	56C	Y360*	56H17T2017	\$301	E3	1.8/0.9	20	10.55	
	1800	575	TENV	56C	Y361	56H17T2019	\$301	E3	0.7	20	10.55	Q
3/4	1800	230	TEFC	56C	Y506*	56H17F2011	\$372	E3	2.8	23	11.19	
	1800	230/460	TEFC	56C	Y362*	56H17F2017	\$372	E3	2.8/1.4	23	11.19	
	1800	575	TEFC	56C	Y363	56H17F2015	\$372	E3	1.1	23	11.19	
1	1800	230	TEFC	56C	Y508*	56H17F2013	\$419	E3	3.2	28	12.44	d
	1800	230/460	TEFC	56C	Y364*	56H17F2021	\$419	E3	3.2/1.6	28	12.44	
	1800	575	TEFC	56C	Y365*	56H17F2019	\$419	E3	1.3	28	12.44	
1 1/2	1800	230	TENV	145TC	Y522*	145THTR5328	\$521	E3	4.8	48	13.48	6
	1800	230/460	TENV	145TC	Y366*	145THTR5329	\$521	E3	4.8/2.4	48	13.48	6
	1800	575	TENV	145TC	Y367	145THTR5330	\$521	E3	1.9	48	13.48	6
2	1800	230	TEFC	145TC	Y523*	145THFR5326	\$691	E3	5.8	53	14.87	d,6
	1800	230/460	TEFC	145TC	Y368*	145THFR5329	\$691	E3	5.8/2.9	51	14.87	6
	1800	575	TEFC	145TC	Y369*	145THFR5330	\$691	E3	2.3	51	14.87	6
3	1800	230	TEFC	182/145TC	Y530	182THFR5326	\$815	E3	8.4	52	14.87	d,86,88
	1800	230	TEFC	182TC	Y998	182THFR7726	\$850	E3	8.4	70	16.19	6
	1800	230/460	TEFC	182/145TC	Y370*	182THFR5329	\$815	E3	8.4/4.2	52	14.87	86,88
	1800	230/460	TEFC	182TC	Y999*	182THFR7729	\$850	E3	8.4/4.2	86	16.19	6
	1800	575	TEFC	182/145TC	Y371	182THFR5330	\$815	E3	3.4	52	14.87	86,88
	1800	575	TEFC	182TC	Y270	182THFR7730	\$850	E3	3.4	86	16.19	6
5	1800	230/460	TEFC	184TC	Y372*	184THFR7726	\$967	E3	13.4/6.7	88	16.69	6
	1800	575	TEFC	184TC	Y373	184THFR7736	\$967	E3	5.4	88	16.69	6
7 1/2	1800	230/460	TEFC	213TC	Y994*	213THFW7726	\$1,237	E3	21.4/10.7	98	20.97	6
	1800	575	TEFC	213TC	Y995	213THFW7736	\$1,237	E3	8.5	98	20.97	6
10	1800	230/460	TEFC	215TC	Y996*	215THFW7726	\$1,582	E3	27.6/13.8	125	22.22	6
	1800	575	TEFC	215TC	Y997	215THFW7736	\$1,582	E3	11.1	125	22.22	6

\* Stock Model

**Footnotes:**

- d To be discontinued after current stock is gone
- Q "Quick Connect" terminal board
- 6 Bolt-on, removable base for footless mounting option
- 86 2:1 constant torque speed range
- 88 182T base and shaft height, 145TC mounting face and shaft dimensions

Continued on next page.

# microMAX™ AC Inverter Duty Motor

## 1000:1 Constant Torque (TENV)

## 20:1 Constant Torque (TEFC)

C-Face

microMAX™

HP	RPM	VOLTS	ENCL.	FRAME	CAT NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	F.L. AMPS	APPROX.. WGT. LBS.	"C" DIM.	FOOT NOTES
<b>1/8</b>	1800	230	TENV	56C	Y606*	56H17T2022	\$220	E3	0.7	15	9.05	Q
<b>1/4</b>	1800	230	TENV	56C	Y501*	56H17T2012	\$238	E3	1.0	17	9.80	Q
<b>1/3</b>	1800	230	TENV	56C	Y503*	56H17T2014	\$256	E3	1.2	17	9.80	Q
<b>1/2</b>	1800	230	TENV	56C	Y505*	56H17T2016	\$301	E3	1.8	19	10.55	d,Q
	1800	230/460	TENV	56C	Y374*	56H17T2018	\$301	E3	1.8/0.9	19	10.55	
	1800	575	TENV	56C	Y375	56H17T2020	\$301	E3	0.7	19	10.55	Q
<b>3/4</b>	1800	230	TEFC	56C	Y507*	56H17F2012	\$372	E3	2.8	21	11.44	d
	1800	230/460	TEFC	56C	Y376*	56H17F2018	\$372	E3	2.8/1.4	21	11.44	
	1800	575	TEFC	56C	Y377	56H17F2016	\$372	E3	1.1	21	11.44	
<b>1</b>	1800	230	TEFC	56C	Y521*	56H17F2014	\$419	E3	3.2	27	12.44	d
	1800	230/460	TEFC	56C	Y378*	56H17F2022	\$419	E3	3.2/1.6	27	12.44	
	1800	575	TEFC	56C	Y379	56H17F2020	\$419	E3	1.3	27	12.44	

\* Stock Model

## Performance Data

microMAX™ 20:1 and 1000:1 Constant Torque Motors (all data at 460 volt)

HP	F.L. RPM	MIN. RPM	ENCL	NEMA FRAME	F.L. AMPS 460 V	N.L. AMPS 460 V	F.L. TORQUE (LB-FT)	B.D. TORQUE (LB-FT)	MAX CHP RPM*	F.L. EFFIC	F.L. POWER FACTOR	Ohms/Ph - Equivalent Wye Circuit (at rated operating temp. in a 40°C ambient)**					ROTOR INERTIA (LB-FT <sup>2</sup> )
												R1	R2	X1	X2	XM	
<b>1/8</b>	1750	0	TENV	56C	0.35	0.3	0.4	2.5	3550	65.5	55.0	55.600	39.720	51.200	22.680	896.320	0.040
<b>1/4</b>	1725	0	TENV	56C	0.5	0.3	0.8	3.7	3520	72.0	65.0	37.000	28.604	36.320	17.136	681.000	0.040
<b>1/3</b>	1740	0	TENV	56C	0.6	0.4	1.0	4.5	3520	74.0	67.0	26.160	22.960	30.100	14.620	572.800	0.045
<b>1/2</b>	1730	0	TENV	56C	0.9	0.5	1.5	6.8	3520	80.0	72.0	18.144	17.576	22.112	12.756	521.804	0.075
<b>3/4</b>	1725	90	TEFC	56C	1.4	0.9	2.3	9.5	3520	75.5	70.5	13.984	12.588	15.608	8.316	292.572	0.055
	<b>1</b>	1725	90	TEFC	56C	1.6	0.9	3.0	3520	78.5	77.5	10.820	10.936	12.356	7.468	292.520	0.090
<b>1 1/2</b>	1755	0	TENV	145TC	2.4	1.6	4.5	29.0	3518	85.5	69.0	4.256	3.536	5.996	5.884	161.008	0.140
	<b>2</b>	1740	90	TEFC	145TC	2.9	1.6	6.0	29.0	3530	82.5	77.0	4.244	3.336	6.008	5.880	161.880
<b>3</b>	1735	835	TEFC	182/145TC	4.2	2.3	9.0	38.5	3525	85.5	79.0	3.404	2.692	4.572	4.848	124.740	0.140
	<b>4</b>	1760	90	TEFC	182TC	4.2	2.5	9.0	35.0	3540	87.5	76.0	2.780	1.580	5.230	7.100	98.400
<b>5</b>	1750	90	TEFC	184TC	6.7	3.5	15.0	61.0	3480	88.5	79.0	1.688	1.168	3.256	4.792	77.680	0.450
<b>7 1/2</b>	1770	90	TEFC	213TC	10.7	6.2	22.3	80.0	3565	89.5	72.5	0.707	0.488	2.390	3.200	41.400	0.750
<b>10</b>	1770	90	TEFC	215TC	13.8	7.8	30.0	110.0	3570	91.0	74.0	0.454	0.355	1.680	2.500	33.400	1.000

\* Maximum Constant HP RPM is for direct coupled loads.

\*\* For 230V data, divide 460V data by 4

Performance data based on sine wave tests.

Performance curves available - Contact Marathon Electric

- R1 = Stator Resistance
- R2 = Rotor Resistance
- X1 = Stator Reactance
- X2 = Rotor Reactance
- XM = Magnetizing Reactance

**Footnotes:**

- d To be discontinued after current stock is gone
- Q "Quick Connect" terminal board

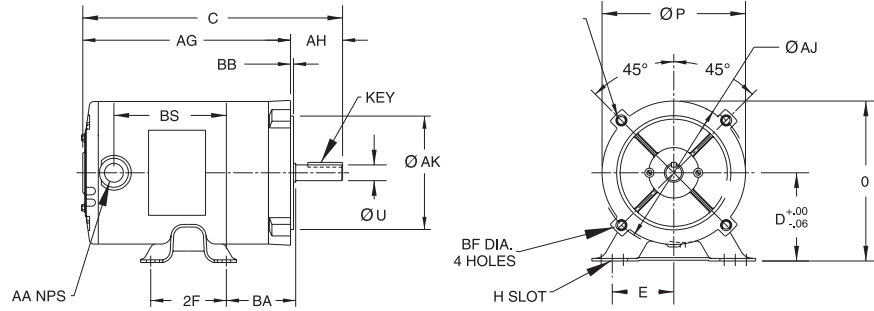
# Dimensions microMAX™

## Totally Enclosed (TENV AND TEFC) C-Face and C-Face with Rigid Base

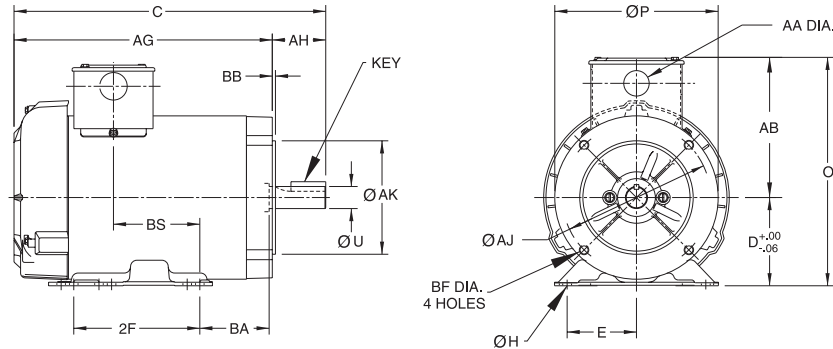
microMAX™

### TENV:

(Single voltage; all TENV multivoltage motors & 1.5 HP models include conduit box)



### TEFC:



HP	ENCL	FRAME	D	E	2F	H	O MAX.	P MAX.	U	AA	AB MAX.	AG MAX.	AH	AJ	AK	BA	BB	BF	BS	KEY
1/8-1/3	TENV	56C	3.50	2.44	3.00	3/4 SLOT	6.35	5.69	.625	.50	NONE	7.74	2.06	5.875	4.500	2.75	.12	3/8-16	3.96	.19x.19x1.38
1/2	TENV	56C	3.50	2.44	3.00	3/4 SLOT	6.35	5.69	.625	.50	NONE	8.49	2.06	5.875	4.500	2.75	.12	3/8-16	4.71	.19x.19x1.38
3/4	TEFC	56C	3.50	2.44	3.00	3/4 SLOT	7.87	5.69	.625	.88	4.44	9.13	2.06	5.875	4.500	2.75	.12	3/8-16	2.81	.19x.19x1.38
1	TEFC	56C	3.50	2.44	3.00	3/4 SLOT	7.87	5.69	.625	.88	4.44	10.38	2.06	5.875	4.500	2.75	.12	3/8-16	4.06	.19x.19x1.38
1 1/2	TENV	145TC	3.50	2.75	5.00	.35	9.06	6.48	.875	1.09	5.56	7.74	2.12	5.875	4.500	2.75	.12	3/8-16	4.68	.19x.19x1.38
2	TEFC	145TC	3.50	2.75	5.00	.35	9.06	6.48	.875	1.09	5.56	7.74	2.12	5.875	4.500	2.75	.12	3/8-16	6.36	.19x.19x1.38
3	TEFC	182/145TC	4.50	3.75	4.50	.44	10.06	6.48	.875	1.09	5.56	8.49	2.12	5.875	4.500	2.75	.12	3/8-16	5.88	.19x.19x1.38
	TEFC	182TC	4.50	3.75	5.50	.44	11.65	10.55	1.125	1.09	7.19	13.07	2.62	7.235	8.500	3.50	.29	1/2-13	2.50	.25x.25x1.75
5	TEFC	184TC	4.50	3.75	5.50	.44	11.65	10.55	1.125	1.09	7.19	16.07	2.62	7.250	8.500	3.50	.27	1/2-13	3.75	.25x.25x1.75
7 1/2	TEFC	213/215TC	5.25	4.25	7.00	.44	12.97	11.13	1.375	1.09	7.75	17.85	3.12	7.235	8.500	4.25	.31	1/2-13	6.93	.31x.31x2.38
10	TEFC	213/215TC	5.25	4.25	7.00	.44	12.97	11.13	1.375	1.09	7.75	19.10	3.12	7.235	8.500	4.25	.31	1/2-13	8.18	.31x.31x2.38

All dimensions are measured in inches. For "C" dimensions, refer to the appropriate catalog page. Certified drawings are available upon request - contact Marathon Electric for details.

# Black Max® Vector Duty 1000:1 Constant Torque Motors



**Applications:** Black Max® TENV motors are used in any high performance application, utilizing Closed- or Open-Loop Vector controls or Volts/Hertz drives, for countless machinery applications, where full torque at zero speed is required. The low inertia design provides extremely quick response to accel and decel commands, as well as changes in direction. Uses include machine tool, conveyors, palletizers, crane & hoist systems, accumulators, packaging equipment, extruders, converting equipment and numerous other motion control applications.

- Features:**
- MAX GUARD® Class F Insulation System
  - Constant torque operation from 0 to base RPM (1000:1)
  - Constant horsepower operation to twice base speed (5-30 HP ratings intermittent duty 90-120 Hz)
  - Continuous duty at 40° C ambient (5-30 HP ratings intermittent duty 90-120 Hz)
  - Cost-effective rolled steel and aluminum frame construction
  - Optimized design for operation with IGBT inverter
  - Thermostats for thermal overload protection (Class F)
  - Normal NEMA frame sizes
  - Encoder and brake provisions included (*non-Explosion Proof*)
  - Removable base on some models, as noted
  - UL Recognized under File #E49747
  - CSA Certified under File #LR2025
  - CE Marked (not Explosion Proof Models)
  - Explosion Proof models UL Listed under File #E12044
  - Explosion Proof models CSA Certified under File #LR47504 and #LR21839
  - Three year warranty on motor and most installed accessories

- Stock Ratings:**
- 1/4 through 30 HP, 1800 RPM, 230/460 Volt
  - 1/2 through 30 HP, 1800 RPM, 575 Volt
  - 1 through 10 HP, 1200 RPM, 230/460 Volt
  - 1/4 through 1 HP, 1800 RPM, 230/460 Volt Explosion Proof

- Encoders:**
- Avtron "HS25A", "HS35A", 1024 and 2048 ppr with 10 pin connector & mating connector
  - Avtron "HS35M", "M3", and "M56", 1024 and 2048 ppr with epic connector & mating connector
  - BEI "HS35", 1024 and 2048 ppr with 10 pin connector & mating connector
  - Dynapar "HS20", "HS35", 1024 & 2048 ppr with 10 pin connector & mating connector
  - NorthStar SL56, "HSD35", 1024 ppr with EPIC connector & mating connector
  - Cable kits for HS35 and SL56 encoders available

- Brakes:**
- Stearns NEMA 2 in 6 lb-ft and 10 lb-ft sizes
  - Brakemotor with encoder available through MOD Central.

# Black Max® Vector Duty 1000:1 Constant Torque

Totally Enclosed Non Ventilated, C-Face with Rigid Base



**Applications:** Designed for inverter or vector applications where up to a 1000:1 constant torque speed range is required. Typical uses include: material handling, machine tools, conveyors, crane and hoist, metal processing, test stands, pumps, compressors, textile processing, and other industrial machinery installed in dusty or dirty environments.

- Features:**
- MAX GUARD® Class F insulation system
  - Constant torque operation from 0 to base speed on vector drive
  - Constant Horsepower operation, up to twice base RPM
  - Continuous duty at 40° C ambient
  - Optimized for operation with IGBT inverter (NEMA Design A)
  - Normally closed thermostats (one per Phase, Class F)
  - Removable rigid base (as noted)
  - Ball bearing
  - Field reversible to F2 (except where noted)
  - Encoder or brake provisions included on opposite drive end (maximum 10 lb-ft brake, see Modifications and/or Accessory Kits sections)
  - UL Recognized, CSA Certified, and CE marked
  - Three year warranty



See performance and dimensions pages 23-24

BlackMax®

HP	RPM	VOLTS	FRAME	OVER LOAD	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	F.L. AMPS	APPROX. WGHT. LBS.	"C" DIM.	FOOT NOTES
<b>1/4</b>	1800	230/460	56C	TSTAT	Y592 *	56H17T2001	\$349	E3	1.2/0.6	19	11.88	S,13
<b>1/2</b>	1800	230/460	56C	TSTAT	Y534 *	56H17T5301	\$437	E3	1.6/0.8	28	13.48	S,6,13
	1800	575	56C	TSTAT	Y555 *	56H17T5311	\$437	E3	0.6	28	13.48	S,6,13
<b>1</b>	1800	230/460	56C	TSTAT	Y535 *	56H17T5302	\$521	E3	3.0/1.5	41	14.98	S,6,13
	1800	575	56C	TSTAT	Y556 *	56H17T5312	\$521	E3	1.2	41	14.98	S,6,13
	1800	230/460	143TC	TSTAT	Y536 *	143THTR5326	\$535	E3	3.0/1.5	43	15.04	S,6,13
	1200	230/460	145TC	TSTAT	Y537 *	145THTR5376	\$620	E3	3.8/1.9	49	16.04	S,6,13
<b>1 1/2</b>	1800	230/460	145TC	TSTAT	Y538 *	145THTR5326	\$650	E3	4.8/2.4	50	16.04	S,6,13
<b>2</b>	1800	230/460	145TC	TSTAT	Y551 *	145THTN6046	\$898	E3	6.0/3.0	72	14.68	
	1800	575	145TC	TSTAT	Y557 *	145THTN6060	\$898	E3	2.4	72	14.68	
	1200	230/460	184TC	TSTAT	Y540 *	184THTL7776	\$1,284	E3	6.6/3.3	88	16.94	AL
<b>3</b>	1800	230/460	182TC	TSTAT	Y541 *	182THTL7726	\$1,113	E3	8.4/4.2	96	17.39	AL
	1800	575	182TC	TSTAT	Y558 *	182THTL7736	\$1,113	E3	3.4	96	17.39	AL
	1200	230/460	213TC	TSTAT	Y542 *	213THTL7776	\$1,582	E3	9.4/4.7	118	19.94	AL
<b>5</b>	1800	230/460	184TC	TSTAT	Y543 *	184THTL7726	\$1,329	E3	14.0/7.0	98	18.94	AL
	1800	575	184TC	TSTAT	Y559 *	184THTL7736	\$1,329	E3	5.6	98	18.94	AL
	1200	230/460	215TC	TSTAT	Y544 *	215THTL7776	\$1,924	E3	15.4/7.7	138	20.54	AL
<b>7 1/2</b>	1800	230/460	213TC	TSTAT	Y545 *	213THTL7726	\$1,745	E3	21.0/10.5	146	20.54	AL
	1800	575	213TC	TSTAT	Y560 *	213THTL7736	\$1,745	E3	8.4	146	20.54	AL
	1200	230/460	254TC	TSTAT	Y546 *	254THTL5776	\$2,588	E3	22.0/11.0	209	25.37	AL,I
<b>10</b>	1800	230/460	215TC	TSTAT	Y547 *	215THTL7726	\$2,087	E3	27.0/13.5	159	23.04	AL
	1800	575	215TC	TSTAT	Y561 *	215THTL7736	\$2,087	E3	10.8	159	23.04	AL
	1200	230/460	256TC	TSTAT	Y548 *	256THTL5776	\$2,930	E3	28.0/14.0	275	26.87	AL,I
<b>15</b>	1800	230/460	254TC	TSTAT	Y549 *	254THTL5726	\$2,484	E3	40.0/20.0	250	26.87	AL,I
	1800	575	254TC	TSTAT	Y562 *	254THTL5736	\$2,484	E3	16.0	250	26.87	AL,I
<b>20</b>	1800	230/460	256TC	TSTAT	Y552 *	256THTNA7026	\$3,626	E3	52.0/26.0	300	27.13	
	1800	575	256TC	TSTAT	Y563 *	256THTNA7036	\$3,626	E3	20.8	300	27.13	
<b>25</b>	1800	230/460	284TC	TSTAT	Y553 *	284THTNA7026	\$3,944	E3	62.0/31.0	495	27.08	I
	1800	575	284TC	TSTAT	Y567 *	284THTNA7036	\$3,944	E3	24.8	495	27.08	I
<b>30</b>	1800	230/460	286TC	TSTAT	Y393 *	286THTNA7026	\$4,447	E3	74.0/37.0	575	28.58	
	1800	575	286TC	TSTAT	Y394 *	286THTNA7036	\$4,447	E3	29.6	575	28.58	

Blue shaded areas are cast iron frames.

\* Stock Model

Contact Marathon Electric for other base speeds and options not shown in this catalog.

**Footnotes:**

AL Aluminum Frame Construction  
I Reduced Hp @ 120 Hz operation

S Steel Frame Construction  
6 Bolt-on, removable base for footless mounting option  
13 F1 Mounting Only, cannot modify to F2



# Black Max® Vector Duty Encoders Through Mod Central (Non-Explosion Proof)

ENCL.	NEMA FRAME	BRAND / MODEL	PPR	CAT. NO.	KIT NO.	LIST PRICE	NOTES
TENV (5/8" bore)	56-286	Avtron HS25A	1024	A746*	KIT HS25A1024-NV	\$950	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Avtron HS25A	2048	A747	KIT HS25A2048-NV	\$950	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Avtron HS35A	1024	A736*	KIT HS35A1024-NV	\$1,291	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Avtron HS35A	2048	A739*	KIT HS35A2048-NV	\$1,291	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Avtron HS35M	1024	A742*	KIT HS35M1024	\$1,495	Shaft Mount, 5-24 VDC, with EPIC connector/mate
		Avtron HS35M	2048	A744	KIT HS35M2048	\$1,495	Shaft Mount, 5-24 VDC, with EPIC connector/mate
		Avtron M3	1024	A753*	KIT M31024-NV	\$2,500	Shaft Mount, 5-24 VDC, with EPIC connector/mate
		Avtron M56	1024	A793*	KIT M561024-NV	\$2,038	Modular Mount, 5-24 VDC, with EPIC connector/mate, Double C-Face
		NorthStar SL56	512	A785*	KIT LKSR512	\$2,038	Modular Mount, 5-15 VDC, with EPIC connector/mate
		NorthStar SL56	1024	A763*	KIT LKSR02	\$2,038	Modular Mount, 5-15 VDC, with EPIC connector/mate
		NorthStar SL56	1024	A786*	KIT LKSR-CFACE	\$2,241	Modular Mount, 5-15 VDC, with EPIC connector/mate, Double C-Face
		NorthStar SL56	2048	A797	KIT LKSR2048	\$2,038	Modular Mount, 5-15 VDC, with EPIC connector/mate
		NorthStar HSD35	1024	A711*	KIT HSD351024-NV	\$1,395	Shaft Mount, 5-26 VDC, with EPIC connector/mate
		Dynapar HS20	1024	A687*	KIT HS201024-NV	\$600	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Dynapar HS35	1024	A772*	KIT HS351024-NV	\$1,291	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Dynapar HS35	2048	A776*	KIT HS352048-NV	\$1,291	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		BEI HS35	1024	A779*	KIT HS35B1024-NV	\$1,291	Shaft Mount, 5-28 VDC, with 10 pin connector/mate
		BEI HS35	2048	A780*	KIT HS35B2048-NV	\$1,291	Shaft Mount, 5-28 VDC, with 10 pin connector/mate

\* Stock Model

## Brakes Through Mod Central Stearns 56000-Series, NEMA 2 Spring-Set Disc Type (Non-Explosion Proof)

### Cable Kits For Encoders

DESCRIPTIONS	CAT. NO.	CABLE LENGTH (FT.)	LIST PRICE	MULT. SYMB.
Fits HS35 Encoders - Encoder cable is prewired with 10 pin mating connector	A688-10*	10	\$249	E3
	A688-50*	50	\$647	E3
Fits Northstar encoders - Bulk Cable	A690-15*	15	\$206	E3

\* Stock Model

TORQUE (LB/FT)	COIL VOLTAGE	CAT. NO.	KIT NO.	LIST PRICE INSTALLED	MULT. SYMB.
6	115/208-230	A317*	KIT BM6BRK115	\$638	E3
10	115/208-230	A318*	KIT BM10BRK115	\$775	E3
6	230/460	A312*	KIT BM6BRK	\$638	E3
10	230/460	A313*	KIT BM10BRK	\$775	E3
6	575	A315*	KIT BM6BRK575	\$638	E3
10	575	A316*	KIT BM10BRK575	\$775	E3

\* Stock Model

See Brakemotor section for larger brakemotor ratings.

## Performance Data

### Black Max® 1000:1 Constant Torque Motors (all data at 460 volt)

HP	F.L. RPM	MIN. RPM	ENCL	NEMA FRAME	F.L. AMPS 460 V	N.L. AMPS 460 V	F.L. TORQUE (LB-FT)	B.D. TORQUE (LB-FT)	MAX CHP RPM*	F.L. EFFIC	F.L. POWER FACTOR	Ohms/Ph - Equivalent Wye Circuit (460 Vac) (at rated operating temp. in a 40°C ambient)**					ROTOR INERTIA (LB-FT <sup>2</sup> )
												R1	R2	X1	X2	XM	
1/4	1755	0	TENV	56C	0.6	0.45	0.75	4.5	3540	70.0	58.0	26.265	22.967	30.244	14.667	571.911	0.045
1/2	1735	0	TENV	56C	0.8	0.52	1.5	5.8	3510	80.0	72.0	22.307	17.028	24.123	18.163	532.976	0.056
1	1750	0	TENV	56C-143TC	1.5	1.0	3.0	15.0	3505	84.0	75.0	8.378	5.623	10.707	9.912	278.036	0.110
	1145	0	TENV	145TC	1.9	1.3	4.5	16.0	2260	80.0	62.5	10.302	8.372	13.793	15.325	193.835	0.140
1 1/2	1755	0	TENV	145TC	2.4	1.6	4.5	29.0	3500	85.5	69.0	4.257	3.538	5.998	5.884	161.009	0.140
2	1750	0	TENV	145TC	3.0	1.7	6.0	28.5	3525	85.5	78.0	3.834	2.897	5.950	5.637	154.800	0.130
	1160	0	TENV	184TC	3.3	2.1	9.1	34.0	2315	82.5	67.5	3.948	3.436	7.725	12.113	116.900	0.380
3	1755	0	TENV	182TC	4.2	2.2	9.0	48.0	3515	85.5	80.0	2.356	1.731	4.266	4.304	123.930	0.420
	1158	0	TENV	213TC	4.7	3.0	13.6	49.0	2300	82.5	72.5	2.469	2.308	6.508	4.125	83.910	0.600
5	1765	0	TENV	184TC	7.0	4.2	14.9	70.0	3555	89.5	74.5	1.242	0.947	2.534	4.236	64.128	0.550
	1165	0	TENV	215TC	7.7	4.8	22.5	87.0	2320	84.0	71.0	1.130	1.250	3.709	2.573	51.972	0.900
7 1/2	1765	0	TENV	213TC	10.5	5.5	22.3	95.5	3540	90.2	76.0	0.699	0.567	1.765	2.260	38.178	0.850
	1170	0	TENV	254TC	11.0	6.0	33.7	118.0	1755	87.5	73.0	0.510	0.680	2.846	3.247	42.714	1.200
10	1774	0	TENV	215TC	13.5	7.4	29.6	125.0	3550	90.2	76.0	0.369	0.338	1.423	2.281	34.932	1.300
	1160	0	TENV	256TC	14.0	7.0	45.3	135.0	1745	89.5	75.5	0.534	0.693	2.258	2.323	30.530	1.500
15	1765	0	TENV	254TC	20.0	11.0	44.6	170.0	2660	92.4	76.0	0.314	0.316	1.047	1.569	22.151	1.600
20	1770	0	TENV	256TC	26.0	14.5	59.5	325.0	3570	93.6	77.0	0.220	0.192	0.675	0.684	18.204	3.500
25	1770	0	TENV	284TC	31.0	14.0	74.2	330.0	2665	93.6	80.0	0.143	0.160	0.724	0.678	13.965	4.400
30	1772	0	TENV	286TC	37.0	18.5	89.0	425.0	3560	94.5	80.0	0.113	0.123	0.543	0.557	11.200	5.500

\* Maximum Constant HP RPM is for direct coupled loads.

\*\* For 230V data, divide 460V data by 4.

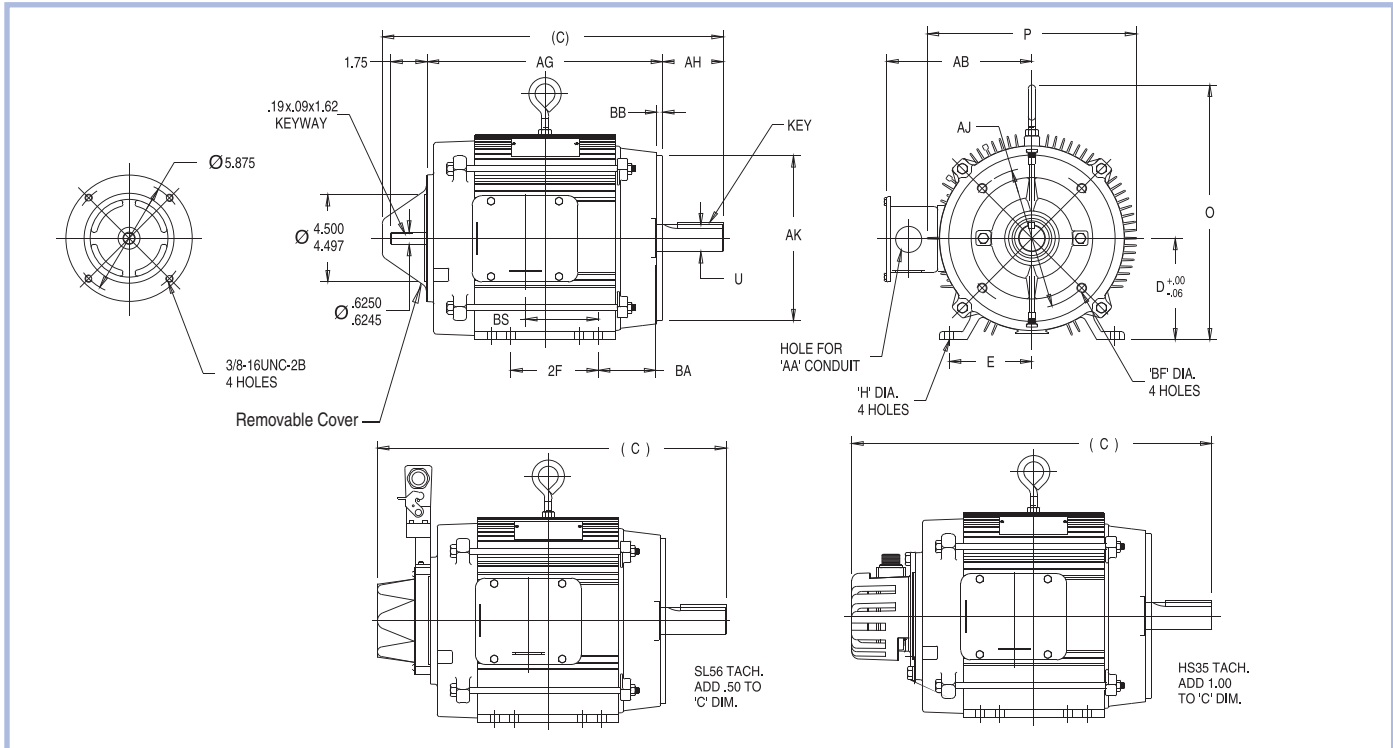
R1 = Stator Resistance  
R2 = Rotor Resistance  
X1 = Stator Reactance  
X2 = Rotor Reactance  
XM = Magnetizing Reactance

Performance data based on sine wave tests.  
Performance curves available - Contact Marathon Electric

# Dimensions

## Black Max® Vector Duty

### Totally Enclosed Non-Ventilated C-Face with Rigid Base



FRAME	CONSTRUCTION	D	E	2F	H	O MAX.	P MAX.	U	AA	AB MAX.	AG MAX.	AH	AJ	AK	BA	BB MAX.	BF	BS MAX.	KEY
56C *	ROLLED STEEL	3.50	2.44	3.00	.34 SLOT	6.35	5.69	.625	.88	4.37	7.50	2.06	5.875	4.500	2.75	.13	3/8-16	2.84	.19x.19x1.38
56C	ROLLED STEEL	3.50	2.44	3.00	.35	6.71	6.48	.625	.88	5.56	10.61	2.06	5.875	4.500	2.75	.13	3/8-16	5.25	.19x.19x1.38
143TC	ROLLED STEEL	3.50	2.75	4.00	.35	6.71	6.48	.875	1.09	5.56	10.61	2.12	5.875	4.500	2.75	.13	3/8-16	4.93	.19x.19x1.38
145TC	ROLLED STEEL	3.50	2.75	5.00	.35	6.71	6.48	.875	1.09	5.56	11.61	2.12	5.875	4.500	2.75	.13	3/8-16	5.93	.19x.19x1.38
145TC	CAST IRON	3.50	2.75	5.00	.35	6.71	7.98	.875	1.09	5.56	11.61	2.12	5.875	4.500	2.75	.13	3/8-16	5.93	.19x.19x1.38
182TC	ALUMINUM	4.50	3.75	4.50	.44	9.38	9.78	1.125	1.09	7.02	13.00	2.62	7.250	8.500	3.50	.27	1/2-13	3.25	.25x.25x1.75
184TC	ALUMINUM	4.50	3.75	5.50	.44	9.38	9.78	1.125	1.09	7.02	15.00	2.62	7.250	8.500	3.50	.27	1/2-13	4.25	.25x.25x1.75
213TC	ALUMINUM	5.25	4.25	5.50	.44	10.62	10.78	1.375	1.34	7.50	14.81	3.12	7.250	8.500	4.25	.28	1/2-13	5.25	.31x.31x2.38
215TC	ALUMINUM	5.25	4.25	7.00	.44	10.62	10.78	1.375	1.34	7.50	17.81	3.12	7.250	8.500	4.25	.28	1/2-13	9.25	.31x.31x2.38
254TC	ALUMINUM	6.25	5.00	8.25	.56	11.62	10.78	1.625	1.25	8.10	20.81	3.75	7.250	8.500	4.75	.27	1/2-13	10.40	.38x.38x2.88
256TC	ALUMINUM	6.25	5.00	10.00	.56	14.07	10.78	1.625	1.25	11.25	20.81	3.75	7.250	8.500	4.75	.27	1/2-13	10.40	.38x.38x2.88
256TC	CAST IRON	6.25	5.00	10.00	.56	16.49	14.27	1.625	1.25	10.68	21.07	3.75	7.250	8.500	4.75	.27	1/2-13	4.75	.38x.38x2.88
284TC	CAST IRON	7.00	5.50	9.50	.53	15.57	15.88	1.875	2.00	13.31	20.39	4.38	9.000	10.500	4.75	.27	3/8-16	4.75	.50x.50x3.25
286TC	CAST IRON	7.00	5.50	11.00	.53	15.57	15.88	1.875	2.00	13.31	21.89	4.38	9.000	10.500	4.75	.27	3/8-16	5.50	.50x.50x3.25

\*56C, 2000 - Series Model Numbers

All dimensions are measured in inches. For "C" dimensions, refer to the appropriate catalog page. Certified drawings are available upon request - contact Marathon Electric for details.

# Black Max® Vector Duty 1000:1 Constant Torque Explosion Proof, Class I Groups C & D, Class II Groups F & G Totally Enclosed Non-Ventilated, C-Face with Rigid Base

**Applications:** For use in material handling, machine tools, conveyors, crane & hoist, and other variable speed applications requiring up to 1000:1 constant torque speed range, to be installed in hazardous environments as defined by the motor's explosion proof class and group rating. Refer to the General Information sections contained in this catalog for information on explosion proof classifications. Consult the National Electrical Code and your local regulations for the proper selection of motors in hazardous locations.



- Features:**
- MAX GUARD® Class F insulation system
  - Constant torque operation from 0 to base speed on vector drive
  - Constant HP operation to twice base RPM
  - Continuous duty at 40° C ambient
  - Optimized for operation with IGBT inverter (NEMA Design A)
  - Normally closed thermostats (one per phase, Class F)
  - Ball bearing
  - Top mount (F3) conduit box included, shipped loose
  - No Encoder Provisions included
  - UL listed, temperature code T3B, under file #E12044
  - CSA certified, under file numbers LR47504 and LR21839
  - Three year warranty



See performance data below and dimensions on next page

HP	RPM	VOLTS	FRAME	OVER LOAD	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	F.L. AMPS	APPROX. WGT.LBS.	"C" DIM.	FOOT NOTES
1/4	1800	230/460	56C	TSTAT	Y600*	56H17E5301	\$520	E3	1.1/0.55	34	11.97	
1/3	1800	230/460	56C	TSTAT	Y601	56H17E5302	\$610	E3	1.2/0.6	34	11.97	
1/2	1800	230/460	56C	TSTAT	Y602*	56H17E5303	\$658	E3	1.8/0.9	39	12.47	
3/4	1800	230/460	56C	TSTAT	Y603	56H17E5304	\$728	E3	2.4/1.2	42	13.47	
1	1800	230/460	56C	TSTAT	Y604*	56H17E5305	\$797	E3	3.0/1.5	45	13.97	

\* Stock Model

Contact Marathon Electric for other base speeds and options not shown in this catalog.

## Performance Data

### Black Max® 1000:1 Constant Torque Explosion Proof Motors (all data at 460 volt)

HP	F.L. RPM	MIN. RPM	ENCL	NEMA FRAME	F.L. AMPS	N.L. AMPS	F.L. TORQUE	B.D. TORQUE	MAX CHP	F.L. EFFIC	F.L. POWER	Ohms/Ph - Equivalent Wye Circuit (460 Vac) (at rated operating temp. in a 40°C ambient)**					ROTOR INERTIA (LB-FT <sup>2</sup> )
					460 V	460 V	(LB-FT)	(LB-FT)	RPM*	FACTOR	R1	R2	X1	X2	XM		
1/4	1725	0	EPNV	56C	0.55	0.4	0.75	3.7	3450	71.0	61.5	34.097	21.998	32.297	19.298	533.947	0.038
1/3	1725	0	EPNV	56C	0.6	0.4	1.0	3.7	3450	74.5	71.0	34.572	24.080	36.550	24.252	675.960	0.038
1/2	1725	0	EPNV	56C	0.9	0.50	1.5	5.8	3510	80.0	72.0	20.379	15.041	24.237	17.936	518.219	0.056
3/4	1755	0	EPNV	56C	1.2	0.80	2.25	10.2	3450	82.5	73.5	11.000	7.409	13.268	12.209	339.822	0.090
1	1750	0	EPNV	56C	1.5	1.0	3.0	15.0	3505	84.0	75.0	8.378	5.623	10.707	9.912	278.036	0.110

\* Maximum Constant HP RPM is for direct coupled loads.

\*\* For 230V data, divide 460V data by 4.

**Performance data based on sine wave tests.**

**Performance curves available - Contact Marathon Electric**

- R1 = Stator Resistance
- R2 = Rotor Resistance
- X1 = Stator Reactance
- X2 = Rotor Reactance
- XM = Magnetizing Reactance

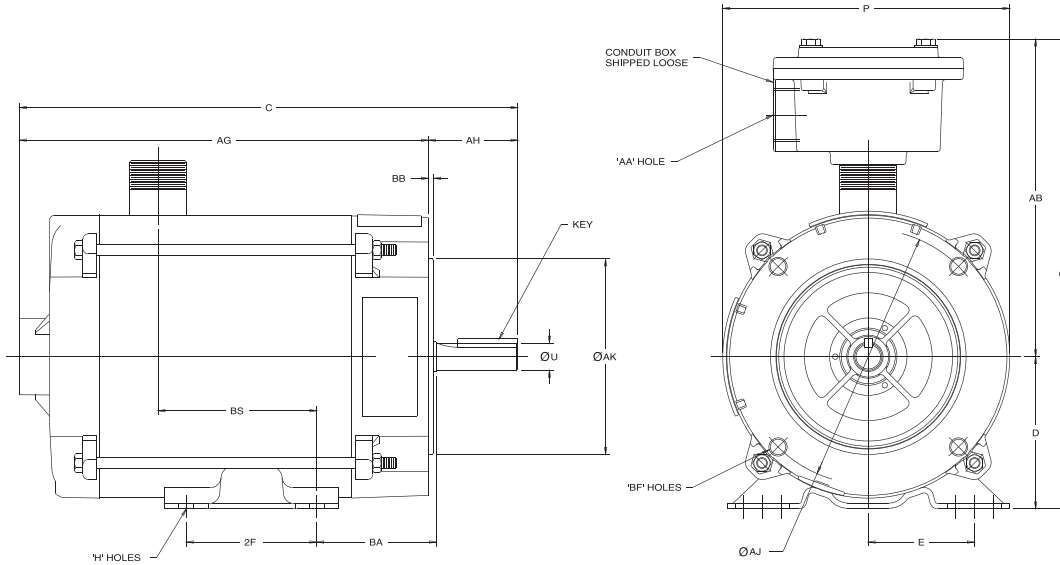
BlackMax®

# Dimensions

## Black Max® Vector Duty

### Explosion Proof, Class I Groups C & D, Class II Groups F & G

Totally Enclosed Non-Ventilated, C-Face with Rigid Base



FRAME	CONSTRUCTION	D	E	2F	H	O MAX.	P MAX.	U	AA	AB MAX.	AG MAX.	AH	AJ	AK	BA	BB	BF	BS MAX.	KEY
56C	ROLLED STEEL	3.50	2.44	3.00	.35	10.81	6.60	.625	1.00	7.31	11.91	2.06	5.875	4.50	2.75	.16	3/8-16	6.15	.19x.19x1.38

All dimensions are measured in inches. For "C" dimensions, refer to the appropriate catalog page. Certified drawings are available upon request - contact Marathon Electric for details.

## Blue Max® 2000 Vector Duty 2000:1 Constant Torque Motors



**Applications:** Blue Max® motors are used in variable frequency drive applications requiring full rated torque at zero speed, utilizing Closed- or Open-Loop (*Sensorless*) Vector controls, or up to a 20:1 constant torque range, utilizing Volts/Hertz drives. The cast iron construction makes this motor an ideal choice for process lines, chemical plants, paper mills or any other environment requiring cast iron or "severe duty" construction.

- Features:**
- MAX GUARD® Insulation System
  - Constant torque operation from 0 to base RPM (*2000:1*) on Vector Drives
  - Constant torque operation from 1/20 speed to base RPM (*20:1*) on Volts/Hertz Drives (*TEFC*)
  - Constant horsepower operation up to twice base speed (*design-dependent*)
  - Continuous duty at 40° C ambient
  - Cast Iron construction
  - Optimized design for operation with IGBT inverter
  - Normally closed thermostats (one per phase, Class F)
  - Stock TENV and TEBC models C-Face through 100 HP
  - Stock TEBC models designed for "B" temperature rise (*generous thermal capacity*)
  - Encoder provisions included on all stock models
  - UL Recognized under File #E49747
  - CSA Certified under File #LR2025
  - CE Marked (not Explosion Proof Models)
  - Explosion Proof models UL Listed under File #E12044
  - Explosion Proof models CSA Certified under File #LR47504 and LR21839
  - Three year warranty on motor and most installed accessories

- Stock Ratings:**
- TEFC ratings from 213TC-445T
  - TENV ratings from 143TC-256TC
  - TEBC ratings from 284TC-449T
  - Models through 20 HP are C-Face with Rigid Base (*all enclosures*)
  - TEBC models 25-100 HP are C-Face with Rigid Base
  - Explosion Proof 1-20 HP, with 1024 ppr explosion proof encoder
  - 1-20 HP Brakemotors, with 140% rated NEMA 2 brakes
  - 230/460 Volt through 100 HP, 460 Volt 125-350 HP. Other voltages available.

- Modified Capabilities:**
- Dripproof Force Ventilated (*DPFV*): 364T-6805 Frame (1250 HP)
  - Totally Enclosed Non-Ventilated (*TENV*), continuous or 60 minute duty: 143T-5013
  - Totally Enclosed Fan-Cooled (*TEFC*): 182T-5013
  - Totally Enclosed Blower Cooled (*TEBC*): 213T-5013
  - Explosion Proof Non-Ventilated (*EPNV*): 143T-449T
  - Explosion Proof Fan-Cooled (*EPFC*): 143T-449T
  - 575 volt and any other base frequency/voltage available on a "build-up" basis

- Encoders:**
- Avtron "HS25A", "HS35A", 1024 and 2048 ppr with 10 pin connector & mating connector (*TENV, TEFC & TEBC*)
  - Avtron "HS35M", "M3", 1024 ppr with EPIC connector & mating connector (*TENV & TEFC*)
  - Avtron "M56"/"M85", 1024 ppr with Epic connector & mating connector (*TENV & TEBC*)
  - BEI "HS35", 1024 and 2048 ppr with 10 pin connector & mating connector
  - Dynapar "HS35", 1024 and 2048 ppr with 10 pin connector & mating connector
  - NorthStar SL56, 1024 ppr with EPIC connector & mating connector (*TENV & TEBC*)
  - NorthStar "MagCoder", 1024 ppr with EPIC connector & mating connector
  - Cable kits for HS35 and SL56 encoders available

- Brakes:**
- Stearns NEMA 2 in 6 lb-ft and 10 lb-ft sizes
  - Brakemotor with encoder available through MOD Central, utilizing A786 encoder kit

# Blue Max® 2000 Vector Duty 2000:1 Constant Torque

Totally Enclosed Rigid Base, and C-Face with Rigid Base



**Applications:** Designed for inverter or vector applications where up to a 2000:1 constant torque speed range is required. Typical uses include: material handling, machine tools, conveyors, crane and hoist, metal processing, test stands, pumps, compressors, textile processing, and other industrial machinery installed in dusty or dirty environments where cast iron construction is required.

- Features:**
- MAX GUARD® Class H insulation system (Class H on catalog models only)
  - Constant torque operation from 0 to base speed on vector drive, including TEFC (On Volts/Hertz drives, TEFC motors are limited to 20:1 Constant torque)
  - Constant HP operation to twice base speed (143-254 frame); 1.5 times base (all others)
  - Optimized for operation with IGBT inverter
  - C-Face with rigid base through 100 HP (as noted)
  - Normally closed thermostats (one per phase, Class F)
  - Continuous duty at 40° C ambient
  - 1.0 Service Factor ("B" rise on TEFC motors, as noted)
  - Blue Chip quality, cast iron frame and brackets
  - Patented "fracket" design (TEFC enclosure)
  - Ball bearing (roller bearing available 360 Frame & larger)
  - F1 standard, field reversible to F2
  - Encoder provisions included on opposite drive end (see Modification and/or Accessory Kits sections)
  - UL Recognized, CSA Certified, and CE Marked
  - Three year warranty



See performance and dimensions pages 31-34

HP	RPM	VOLTS	ENCL.	FRAME	OVER LOAD	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES
1	1800	230/460	TENV	143TC	TSTAT	Y525 *	143THTN8028	\$938	E3	3.0/1.5	61	13.68	B
1 1/2	1800	230/460	TENV	145TC	TSTAT	Y590 *	145THTN8037	\$943	E3	4.6/2.3	63	14.68	
2	1800	230/460	TENV	145TC	TSTAT	Y526 *	145THTN8029	\$1,016	E3	6.0/3.0	70	14.68	
3	1800	230/460	TENV	182TC	TSTAT	Y527 *	182THTS8028	\$1,276	E3	8.0/4.0	110	16.68	
5	1800	230/460	TENV	184TC	TSTAT	Y564 *	184THTS8028	\$1,427	E3	13.4/6.7	117	17.68	
7 1/2	1800	230/460	TEFC	213TC	TSTAT	Y595 *	213THFS8028	\$1,669	E3	19.4/9.7	183	21.03	
	1800	230/460	TENV	213TC	TSTAT	Y565 *	213THTS8038	\$1,922	E3	21.0/10.5	180	20.56	
10	1800	230/460	TEFC	215TC	TSTAT	Y596 *	215THFS8029	\$1,994	E3	25.4/12.7	211	22.53	
	1800	230/460	TENV	215TC	TSTAT	Y566 *	215THTS8038	\$2,280	E3	26.0/13.0	290	22.74	
15	1800	230/460	TEFC	254TC	TSTAT	Y597 *	254THFNA8038	\$2,402	E3	37.0/18.5	339	26.34	
	1800	230/460	TENV	254TC	TSTAT	Y509 *	254THTNA8058	\$2,729	E3	38.0/19.0	350	23.38	
	1200	230/460	TEBC	284TC	TSTAT	Y395	284THFPA8086	\$5,354	E3	40.0/20.0	480	37.48	94
20	1800	230/460	TEFC	256TC	TSTAT	Y598 *	256THFNA8038	\$2,658	E3	52.0/26.0	375	28.09	
	1800	230/460	TENV	256TC	TSTAT	Y510 *	256THTNA8038	\$3,777	E3	52.0/26.0	300	27.13	
	1200	230/460	TEBC	286TC	TSTAT	Y582 *	286THFPA8086	\$6,921	E3	52.4/26.2	500	38.98	94
25	1800	230/460	TEFC	284T	TSTAT	Y569 *	284THFPA8028	\$3,319	E3	63.0/31.5	493	28.58	
	1800	230/460	TEBC	284TC	TSTAT	Y511 *	284THFPA8038	\$4,639	E3	63.0/31.5	500	37.48	94
	1200	230/460	TEBC	324TC	TSTAT	Y583 *	324THFPA8086	\$8,141	E3	67.0/33.5	620	40.41	B,d,94
30	1800	230/460	TEFC	286T	TSTAT	Y570 *	286THFNA8028	\$3,794	E3	77.0/38.5	594	29.91	
	1800	230/460	TEBC	286TC	TSTAT	Y512 *	286THFPA8038	\$5,114	E3	74.0/37.0	520	38.98	94
	1200	230/460	TEBC	326TC	TSTAT	Y584 *	326THFPA8086	\$8,956	E3	80.4/40.2	750	41.91	B,94
40	1800	230/460	TEFC	324T	TSTAT	Y571 *	324THFPA8028	\$4,913	E3	100/50.0	545	30.71	
	1800	230/460	TEBC	324TC	TSTAT	Y513 *	324THFPA8038	\$6,126	E3	100/50.0	700	40.41	94
	1200	230/460	TEBC	364TC	TSTAT	Y585 *	364THFS8391	\$10,804	E3	107/53.5	1011	42.67	94
50	1800	230/460	TEFC	326T	TSTAT	Y572 *	326THFS8028	\$6,078	E3	121/60.5	640	32.44	
	1800	230/460	TEBC	326TC	TSTAT	Y514 *	326THFPA8038	\$7,023	E3	120/60.0	750	41.91	94
	1200	230/460	TEBC	365TC	TSTAT	Y586 *	365THFS8380	\$12,951	E3	124/64.5	1081	43.78	94
60	1800	230/460	TEFC	364T	TSTAT	Y573 *	364THFS8036	\$7,834	E3	147/73.5	965	33.70	
	1800	230/460	TEBC	364TC	TSTAT	Y515 *	364THFS8046	\$8,598	E3	147/73.5	1062	42.67	94
	1200	230/460	TEBC	404TC	TSTAT	Y587 *	404THFS8092	\$14,367	E3	142/71.0	1339	48.22	94

Blue shaded areas are cast iron frames.

\* Stock Model

Contact Marathon Electric for other base speeds and options not shown in this catalog.

Continued on next page

**Footnotes:**

B NEMA Design B

d To be discontinued after current stock is gone

94 Separate power supply required for blower motor

# Blue Max® 2000 Vector Duty 2000:1 Constant Torque

## Totally Enclosed Rigid Base, and C-Face with Rigid Base

See performance and dimensions pages 33-37

HP	RPM	VOLTS	ENCL.	FRAME	OVER LOAD	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	F.L. AMPS	APPROX. WGHT. LBS.	"C" DIM.	FOOT NOTES
75	1800	230/460	TEFC	365T	TSTAT	Y574*	365THFS8036	\$8,875	E3	184/92.0	1006	34.70	
	1800	230/460	TEBC	365TC	TSTAT	Y516*	365THFS8046	\$10,278	E3	180/90.0	1106	43.67	94
	1200	230/460	TEBC	405TC	TSTAT	Y588*	405THFS8378	\$17,505	E3	180/90.0	1350	49.72	B,94
100	1800	230/460	TEFC	405T	TSTAT	Y575*	405THFS8036	\$12,009	E3	230/115	1308	39.32	
	1800	230/460	TEBC	405TC	TSTAT	Y517*	405THFS8046	\$14,347	E3	230/115	1429	49.72	94
	1200	230/460	TEBC	444TC	TSTAT	Y589*	444THFN8384	\$20,092	E3	250/125	2150	52.72	94
125	1800	460	TEFC	444T	TSTAT	Y576*	444THFN8036	\$15,805	E3	143	2062	43.27	
	1800	460	TEBC	444T	TSTAT	Y518*	444THFN8046	\$18,248	E3	138	2110	52.72	B,94
150	1800	460	TEFC	445T	TSTAT	Y577*	445THFN8036	\$18,248	E3	170	2246	45.27	
	1800	460	TEBC	445T	TSTAT	Y519*	445THFN8046	\$20,725	E3	170	2321	54.72	94
200	1800	460	TEFC	445T	TSTAT	Y578*	445THFN8040	\$22,027	E3	230	2404	45.27	
	1800	460	TEBC	445T	TSTAT	Y520*	445THFN8050	\$24,504	E3	230	2457	54.72	94
250	1800	460	TEFC	449T	TSTAT	Y579	449THFS8036	\$27,437	E3	280	2800	53.89	CT
	1800	460	TEBC	449T	TSTAT	Y531*	449THFS8046	\$30,693	E3	295	2880	63.21	94
300	1800	460	TEFC	449T	TSTAT	Y580	449THFS8037	\$31,240	E3	330	2890	53.89	CT
	1800	460	TEBC	449T	TSTAT	Y532*	449THFS8047	\$34,496	E3	327	2950	63.21	94
350	1800	460	TEBC	449T	TSTAT	Y533*	449THFS8048	\$37,753	E3	385	3075	63.21	94

Blue shaded areas are cast iron frames.

\* Stock Model

Contact Marathon Electric for other base speeds and options not shown in this catalog.

## Blue Max® 2000 Vector Duty Encoders Through Mod Central

ENCL.	NEMA FRAME	BRAND / MODEL	PPR	CAT. NO.	KIT NO.	LIST PRICE INSTALLED	NOTES
TENV (5/8" bore)	143-256	Avtron HS25A	1024	A746*	KIT HS25A1024-NV	\$950	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Avtron HS25A	2048	A747	KIT HS25A2048-NV	\$950	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Avtron HS35A	1024	A736*	KIT HS35A1024-NV	\$1,291	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Avtron HS35A	2048	A739*	KIT HS35A2048-NV	\$1,291	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Avtron HS35M	1024	A742*	KIT HS35M1024	\$1,495	Shaft Mount, 5-24 VDC, with EPIC connector/mate
		Avtron HS35M	2048	A744	KIT HS35M2048	\$1,495	Shaft Mount, 5-24 VDC, with EPIC connector/mate
		Avtron M3	1024	A753*	KIT M31024-NV	\$2,500	Shaft Mount, 5-24 VDC, with EPIC connector/mate
		Avtron M56	1024	A793*	KIT M561024-NV	\$2,048	Modular Mount, 5-24 VDC, with EPIC connector/mate, Double C-face
		NorthStar SL56	512	A785*	KIT LKSR512	\$2,038	Modular Mount, 5-15 VDC, with EPIC connector/mate
		NorthStar SL56	1024	A763*	KIT LKSR02	\$2,038	Modular Mount, 5-15 VDC, with EPIC connector/mate
		NorthStar SL56	1024	A786*	KIT LKSR-CFACE	\$2,241	Modular Mount, 5-15 VDC, with EPIC connector/mate, Double C-face
		NorthStar SL56	2048	A797	KIT LKSR2048	\$2,038	Modular Mount, 5-15 VDC, with EPIC connector/mate
		NorthStar HSD35	1024	A711*	KIT HSD351024-NV	\$1,395	Shaft Mount, 5-26 VDC, with EPIC connector/mate
		Dynapar HS20	1024	A687*	KIT HS201024-NV	\$600	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Dynapar HS35	1024	A772*	KIT HS351024-NV	\$1,291	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
Dynapar HS35	2048	A776*	KIT HS352048-NV	\$1,291	Shaft Mount, 5-26 VDC, with 10 pin connector/mate		
BEI HS35	1024	A779*	KIT HS35B1024-NV	\$1,291	Shaft Mount, 5-28 VDC, with 10 pin connector/mate		
BEI HS35	2048	A780*	KIT HS35B2048-NV	\$1,291	Shaft Mount, 5-28 VDC, with 10 pin connector/mate		
TEFC (1" bore)	213-449	Avtron HS35A	1024	A737*	KIT HS35A1024-FC	\$1,291	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Avtron HS35A	2048	A740	KIT HS35A2048-FC	\$1,291	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Avtron HS35M	1024	A742*	KIT HS35M1024	\$1,495	Shaft Mount, 5-24 VDC, with EPIC connector/mate
		Avtron HS35M	2048	A744	KIT HS35M2048	\$1,495	Shaft Mount, 5-24 VDC, with EPIC connector/mate
		Avtron M3	1024	A754*	KIT M31024-FC	\$2,500	Shaft Mount, 5-24 VDC, with EPIC connector/mate
		NorthStar HSD35	1024	A712*	KIT HSD351024-FC	\$1,395	Shaft Mount, 5-26 VDC, with EPIC connector/mate
		Dynapar HS35	1024	A774*	KIT HS351024-FC	\$1,291	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		Dynapar HS35	2048	A777*	KIT HS352048-FC	\$1,291	Shaft Mount, 5-26 VDC, with 10 pin connector/mate
		BEI HS35	1024	A783*	KIT HS35B1024-FC	\$1,291	Shaft Mount, 5-28 VDC, with 10 pin connector/mate
		BEI HS35	2048	A784	KIT HS35B2048-FC	\$1,291	Shaft Mount, 5-28 VDC, with 10 pin connector/mate
TEBC (1" bore)	284-449	Avtron HS35A	1024	A738*	KIT HS35A1024-BC	\$1,291	Shaft Mount, 5-26 VDC, includes A801
		Avtron HS35A	2048	A741	KIT HS35A2048-BC	\$1,291	Shaft Mount, 5-26 VDC, includes A801
		Avtron HS35M	1024	A743	KIT HS35M1024-BC	\$1,495	Shaft Mount, 5-24 VDC, includes A801
		Avtron HS35M	2048	A745	KIT HS35M2048-BC	\$1,495	Shaft Mount, 5-24 VDC, includes A801
		Avtron M56	1024	A794*	KIT M561024-BC	\$2,038	Modular Mount, 5-24 VDC, includes A801
		NorthStar SL56	1024	A764*	KIT LKSR03	\$2,038	Modular Mount, 5-15 VDC, includes A801
		Dynapar HS35	1024	A775*	KIT HS351024-BC	\$1,291	Shaft Mount, 5-26 VDC, includes A801
		Dynapar HS35	2048	A778*	KIT HS352048-BC	\$1,291	Shaft Mount, 5-26 VDC, includes A801
		BEI HS35	1024	A781*	KIT HS35B1024-BC	\$1,291	Shaft Mount, 5-28 VDC, includes A801
		BEI HS35	2048	A782	KIT HS35B2048-BC	\$1,291	Shaft Mount, 5-28 VDC, includes A801
		-----	N/A	A801*	KIT ENCB0X	\$136	Encoder Conduit Box
		Turck A02H	1024	A668*	KIT A02H1024-BC-LED	\$1,450	Shaft Mount, 5-30 VDC, Bulkhead (A801 Not Required), LED cord set (3M)
Turck A02H	2048	A669*	KIT A02H2048-BC-LED	\$1,450	Shaft Mount, 5-30 VDC, Bulkhead (A801 Not Required), LED cord set (3M)		

Footnotes:

\* Stock Model

B NEMA Design B

CT Suitable for 20:1 CT on Vector Drive, continuous duty or 2000:1 CT, 60 minute duty  
 94 Separate power supply required for blower motor

# Blue Max® 2000 Vector Duty

## Brakes Through Mod Central Stearns 56000-Series, NEMA 2 Spring-Set Disc Type

TORQUE (LB-FT)	CAT. NO.	COIL VOLTAGE	KIT NO.	LIST PRICE INSTALLED	MULT. SYMB.
6	A317★	115/208-230	KIT BM6BRK115	\$638	E3
10	A318★	115/208-230	KIT BM10BRK115	\$775	E3
6	A312★	230/460	KIT BM6BRK	\$638	E3
10	A313★	230/460	KIT BM10BRK	\$775	E3
6	A315★	575	KIT BM6BRK575	\$638	E3
10	A316★	575	KIT BM10BRK575	\$775	E3

★ Stock Model

See Brakemotor section for larger brakemotor ratings.

## Cable Kits For Encoders

DESCRIPTIONS	CAT. NO.	CABLE LENGTH (FT.)	LIST PRICE	MULT. SYMB.
Fits HS35 Encoders - Encoder cable is prewired with 10 pin mating connector	A688-10 ★	10	\$249	E3
	A688-50 ★	50	\$647	E3
Fits Northstar encoders - Bulk Cable	A690-15 ★	15	\$206	E3

★ Stock Model



## Blue Max® 2000:1 Constant Torque Motors (all data at 460 volt)

HP	F.L. RPM	MIN. RPM	ENCL	NEMA FRAME	F.L. AMPS 460 V	N.L. AMPS 460 V	F.L. TORQUE (LB-FT)	B.D. TORQUE (LB-FT)	MAX CHP RPM*	F.L. EFFIC	F.L. POWER FACTOR	Ohms/Ph - Equivalent Wye Circuit (460 Vac) (at rated operating temp. in a 40°C ambient)**					ROTOR INERTIA (LB-FT <sup>2</sup> )
												R1	R2	X1	X2	XM	
<b>1</b>	1756	0	TENV	143TC	1.5	0.9	3.0	14.0	3520	85.5	72.0	8.094	5.481	11.644	10.366	301.040	0.10
<b>1 1/2</b>	1750	0	TENV	145TC	2.3	1.5	4.5	24.0	3500	82.5	72.0	6.294	4.498	7.277	7.088	185.409	0.10
<b>2</b>	1750	0	TENV	145TC	3.0	1.7	6.0	28.5	3525	85.5	78.0	3.834	2.897	5.945	5.637	154.780	0.13
<b>3</b>	1760	0	TENV	182TC	4.0	1.9	9.0	35.0	3525	90.2	80.0	2.353	1.616	5.084	7.900	130.410	0.40
<b>5</b>	1750	0	TENV	184TC	6.7	3.5	15.0	61.0	2630	88.5	79.0	1.690	1.168	3.255	4.791	77.679	0.42
<b>7 1/2</b>	1765	0	TEFC	213TC	9.7	4.2	22.5	89.0	3525	88.5	81.0	0.786	0.669	2.506	3.893	63.880	0.80
	1775	0	TENV	213TC	10.5	5.8	22.2	94.0	3540	90.2	75.0	0.575	0.461	1.943	2.986	43.848	1.05
<b>10</b>	1765	0	TEFC	215TC	12.7	5.5	29.8	75.0	2660	90.2	81.0	0.537	0.446	2.031	3.081	48.422	1.10
	1775	0	TENV	215TC	13.0	6.5	29.6	119	3460	91.0	78.0	0.395	0.361	1.477	2.425	36.920	1.40
<b>15</b>	1765	0	TEFC	254TC	18.5	7.0	44.6	108	2650	90.2	83.5	0.429	0.306	1.446	1.875	35.154	2.10
	1772	0	TENV	254TC	20.2	11.8	44.5	180	3565	93.0	74.5	0.299	0.236	1.040	1.414	22.548	2.30
	1170	0	TEBC	284TC	20.0	9.0	67.0	178	1765	88.5	79.0	0.496	0.405	1.656	1.515	28.380	2.50
<b>20</b>	1775	0	TEFC	256TC	26.0	14.0	59.0	195	2660	91.0	78.0	0.226	0.163	0.811	0.436	19.028	2.50
	1770	0	TENV	256TC	26.0	14.5	59.5	325	3570	93.6	77.0	0.220	0.192	0.675	0.684	18.204	3.50
	1160	0	TEBC	286TC	26.2	11.0	90.0	215	1755	87.5	82.0	0.382	0.339	1.342	1.274	24.850	3.00
<b>25</b>	1765	0	TEFC	284T	31.5	14.0	74.4	195	2650	91.7	82.0	0.227	0.178	0.807	1.098	18.582	2.50
	1765	0	TEBC	284TC	31.5	14.0	74.4	195	2650	91.7	82.0	0.227	0.178	0.807	1.098	18.582	2.50
	1170	0	TEBC	324TC	33.5	16.5	112	280	1760	91.7	76.0	0.343	0.219	0.855	0.594	20.634	4.80
<b>30</b>	1776	0	TEFC	286T	38.5	19.0	88.7	285	3350	93.0	78.5	0.113	0.101	0.589	0.766	13.622	4.60
	1765	0	TEBC	286TC	37.0	15.5	89.3	240	2650	91.0	83.0	0.193	0.152	0.679	0.984	17.123	3.00
	1170	0	TEBC	326TC	40.2	18.5	135	320	1755	89.5	78.0	0.203	0.208	1.012	0.942	14.758	5.20
<b>40</b>	1770	0	TEFC	324T	50.0	20.0	119	320	2642	91.7	81.5	0.082	0.077	0.435	0.592	10.281	4.80
	1770	0	TEBC	324TC	50.0	20.0	119	320	2642	91.7	81.5	0.082	0.077	0.435	0.592	10.281	4.80
	1182	0	TEBC	364TC	53.5	26.5	178	450	1778	91.0	77.0	0.138	0.086	0.525	0.676	9.791	13.20
<b>50</b>	1780	0	TEFC	326T	60.5	26.5	148	400	2675	92.4	81.0	0.063	0.046	0.424	0.596	9.997	9.70
	1765	0	TEBC	326TC	60.0	25.0	149	525	3525	93.0	83.5	0.087	0.092	0.437	0.358	9.662	5.50
	1180	0	TEBC	365TC	65.0	28.5	222	525	1775	93.0	78.0	0.090	0.069	0.438	0.586	8.686	15.50
<b>60</b>	1782	0	TEFC	364T	73.5	28.0	177	525	2665	92.4	83.0	0.063	0.042	0.338	0.455	8.845	15.00
	1782	0	TEBC	364TC	73.5	28.0	177	525	2665	92.4	83.0	0.063	0.042	0.338	0.455	8.845	15.00
	1180	0	TEBC	404TC	71.0	28.5	267	850	1770	92.4	86.0	0.085	0.068	0.363	0.300	8.892	28.50
<b>75</b>	1780	0	TEFC	365T	92.0	42.5	221	740	2665	94.1	82.0	0.046	0.031	0.267	0.313	6.275	16.50
	1780	0	TEBC	365TC	90.0	33.0	221	645	2670	93.0	84.0	0.054	0.038	0.299	0.420	8.203	16.00
	1185	0	TEBC	405TC	90.0	31.0	332	715	1775	94.1	83.0	0.056	0.036	0.321	0.452	8.332	31.50
<b>100</b>	1785	0	TEFC	405T	115	38.0	295	900	2675	94.5	86.5	0.034	0.021	0.236	0.219	6.816	27.50
	1785	0	TEBC	405TC	115	38.0	295	900	2675	94.5	86.5	0.034	0.021	0.236	0.219	6.816	27.50
	1190	0	TEBC	444TC	125	56.0	441	1250	1780	94.5	79.0	0.033	0.020	0.213	0.260	4.544	64.00
<b>125</b>	1788	0	TEFC	444T	143	47.0	367	1175	2682	94.5	87.0	0.024	0.010	0.202	0.128	5.413	43.50
	1785	0	TEBC	444T	138	38.0	368	925	2675	95.0	88.5	0.031	0.014	0.254	0.162	6.900	41.00
<b>150</b>	1790	0	TEFC	445T	170	57.0	440	1475	2675	94.5	87.5	0.016	0.009	0.154	0.112	4.423	56.00
	1790	0	TEBC	445T	170	57.0	440	1475	2675	94.5	87.5	0.016	0.009	0.154	0.112	4.423	56.00
<b>200</b>	1790	0	TEFC	445T	230	81.0	587	2260	2680	95.0	86.0	0.013	0.007	0.102	0.079	3.025	66.00
	1790	0	TEBC	445T	230	81.0	587	2260	2680	95.0	86.0	0.013	0.007	0.102	0.079	3.025	66.00
<b>250</b>	1788	0	TEFC	449T	280	85.0	734	2500	2675	95.0	89.0	0.010	0.007	0.093	0.077	2.998	81.00
	1790	0	TEBC	449T	295	103.0	734	2065	2680	95.0	84.0	0.008	0.006	0.083	0.108	2.565	83.00
<b>300</b>	1788	0	TEFC	449T	330	95.0	881	2925	2675	95.4	89.5	0.007	0.006	0.077	0.063	2.791	96.00
	1785	0	TEBC	449T	327	85.0	883	2475	2675	95.4	90.0	0.009	0.007	0.092	0.075	3.087	88.00
<b>350</b>	1784	0	TEBC	449T	385	95.0	1030	2925	2675	95.4	90.0	0.007	0.005	0.076	0.065	2.636	96.00

BlueMax®

Performance data based on sine wave tests.  
Performance curves available - Contact Marathon Electric

\* Maximum Constant HP RPM is for direct coupled loads.  
\*\* For 230V data, divide 460V data by 4.

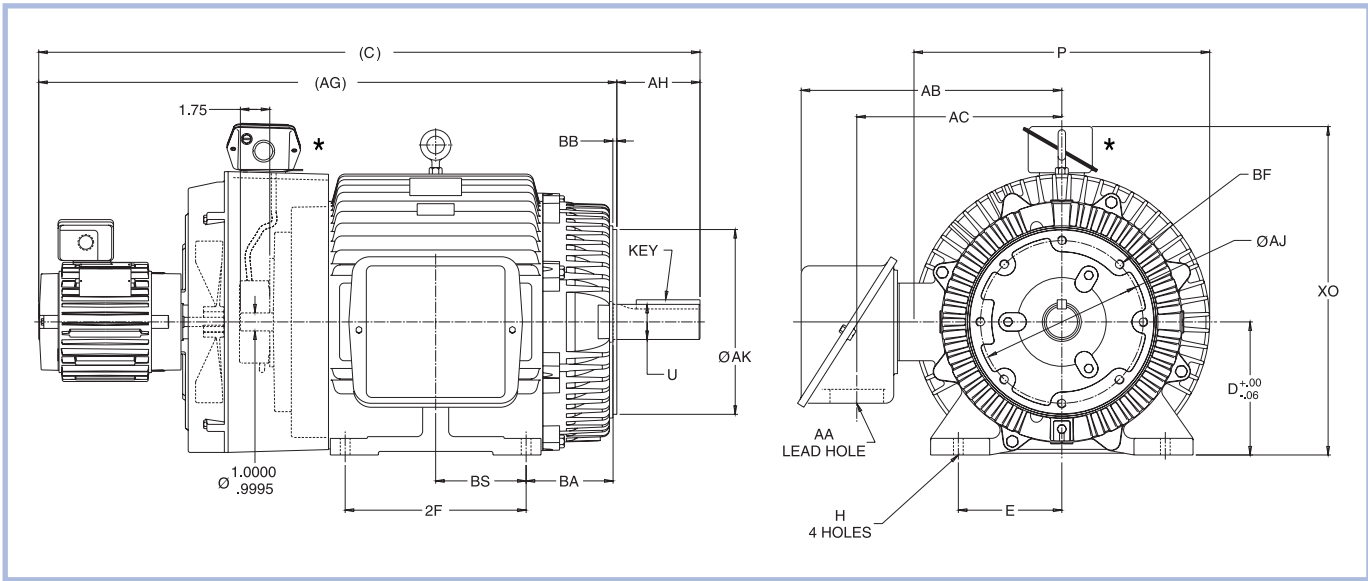
TEFC models are suitable for CT operation on Volts/Hertz drives from 1/20 base speed to base speed, or 2000:1 CT operation on vector drives (60 minute duty > 20:1 CT on Volts/Hertz drives)

- R1 = Stator Resistance
- R2 = Rotor Resistance
- X1 = Stator Reactance
- X2 = Rotor Reactance
- XM = Magnetizing Reactance

# Dimensions

## Blue Max® 2000 Vector Duty

Totally Enclosed Blower Cooled (TEBC), C-Face with Rigid Base



\*Shown with optional encoder conduit box

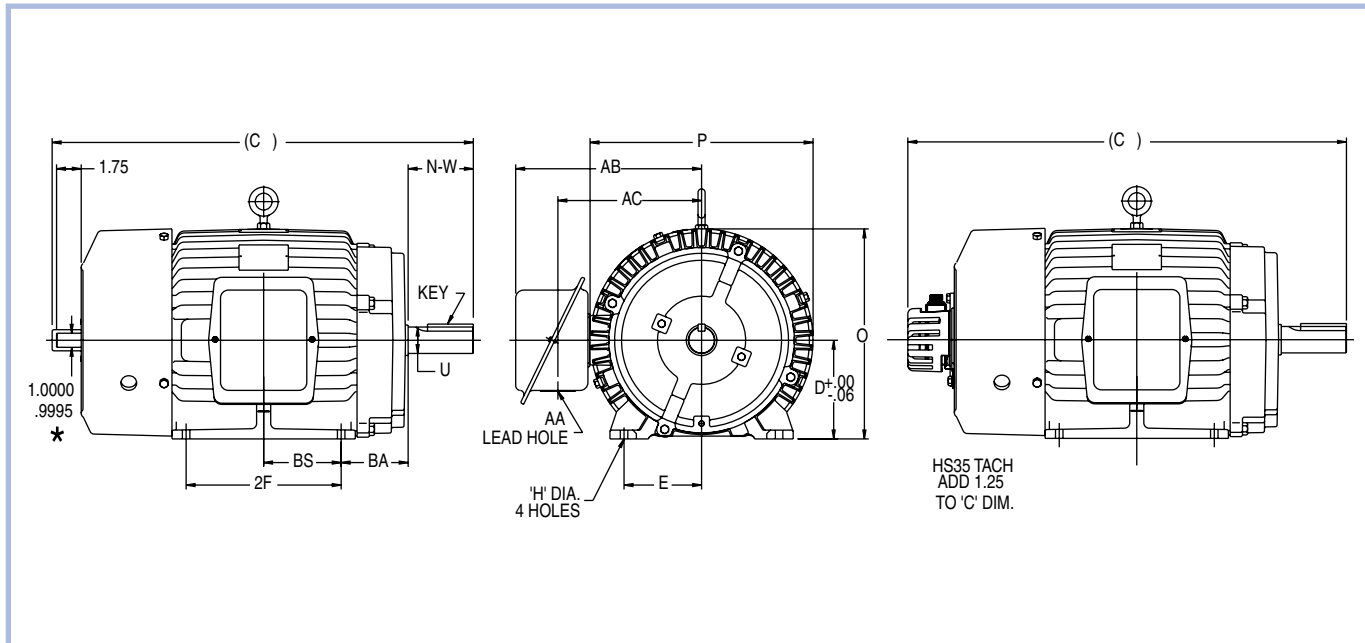
FRAME	D	E	2F	H	XO (MAX)	P (MAX)	U	AA	AB (MAX)	AC (MAX)	AG (MAX)	AH	AJ	AK	BA	BB	BF	BS	KEY
213TC	5.25	4.25	5.50	.44	13.35	11.50	1.38	1.09	9.45	7.69	26.85	3.12	7.250	8.500	3.50	.25	1/2-13	2.75	.31x.31x2.38
215TC	5.25	4.25	7.00	.44	13.35	11.50	1.38	1.09	9.45	7.69	26.35	3.12	7.250	8.500	3.50	.25	1/2-13	3.50	.31x.31x2.38
254TC	6.25	5.00	8.25	.53	16.31	14.27	1.62	1.25	11.13	9.32	30.83	3.75	7.250	8.500	4.25	.25	1/2-13	4.12	.38x.38x2.88
256TC	6.25	5.00	10.00	.53	16.31	14.27	1.62	1.25	11.13	9.32	30.83	3.75	7.250	8.500	4.25	.25	1/2-13	5.00	.38x.38x2.88
284TC	7.00	5.50	9.50	.53	17.88	15.88	1.88	1.50	13.18	9.31	35.22	4.38	9.000	10.500	4.75	.25	1/2-13	4.75	.50x.50x3.25
284TCS	7.00	5.50	9.50	.53	17.88	15.88	1.62	1.50	13.18	9.31	36.60	3.00	9.000	10.500	4.75	.25	1/2-13	4.75	.38x.38x1.88
286TC	7.00	5.50	11.00	.53	17.88	15.88	1.88	1.50	13.18	9.31	35.22	4.38	9.000	10.500	4.75	.25	1/2-13	5.50	.50x.50x3.25
286TCS	7.00	5.50	11.00	.53	17.88	15.88	1.62	1.50	13.18	9.31	36.60	3.00	9.000	10.500	4.75	.25	1/2-13	5.50	.38x.38x1.88
324TC	8.00	6.25	10.50	.66	20.25	18.25	2.12	2.00	14.81	10.69	34.84	5.00	11.000	12.500	5.25	.25	5/8-11	5.25	.50x.50x3.88
324TCS	8.00	6.25	10.50	.66	20.25	18.25	1.88	2.00	14.81	10.69	36.34	3.50	11.000	12.500	5.25	.25	5/8-11	5.25	.50x.50x2.00
326TC	8.00	6.25	12.00	.66	20.25	18.25	2.12	2.00	14.81	10.69	36.34	5.00	11.000	12.500	5.25	.25	5/8-11	6.00	.50x.50x3.88
326TCS	8.00	6.25	12.00	.66	20.25	18.25	1.88	2.00	14.81	10.69	37.84	3.50	11.000	12.500	5.25	.25	5/8-11	6.00	.50x.50x2.00
364TC	9.00	7.00	11.25	.66	22.62	20.00	2.38	3.62	17.85	14.56	36.22	5.62	11.000	12.500	5.88	.25	5/8-11	5.62	.62x.62x4.25
364TCS	9.00	7.00	11.25	.66	22.62	20.00	1.88	3.62	17.85	14.56	38.34	3.50	11.000	12.500	5.88	.25	5/8-11	5.62	.50x.50x2.00
365TC	9.00	7.00	12.25	.66	22.62	20.00	2.38	3.62	17.85	14.56	37.22	5.62	11.000	12.500	5.88	.25	5/8-11	6.12	.62x.62x4.25
365TCS	9.00	7.00	12.25	.66	22.62	20.00	1.88	3.62	17.85	14.56	39.34	3.50	11.000	12.500	5.88	.25	5/8-11	6.12	.50x.50x2.00
404TC	10.00	8.00	12.25	.81	24.06	21.75	2.88	3.62	18.75	14.75	38.89	7.00	11.000	12.500	6.62	.25	5/8-11	6.12	.75x.75x5.62
404TCS	10.00	8.00	12.25	.81	24.06	21.75	2.12	3.62	18.75	14.75	41.89	4.00	11.000	12.500	6.62	.25	5/8-11	6.12	.50x.50x2.75
405TC	10.00	8.00	13.75	.81	24.06	21.75	2.88	3.62	18.75	16.25	40.39	7.00	11.000	12.500	6.62	.25	5/8-11	6.88	.75x.75x5.62
405TCS	10.00	8.00	13.75	.81	24.06	21.75	2.12	3.62	18.75	16.25	43.39	4.00	11.000	12.500	6.62	.25	5/8-11	6.88	.50x.50x2.75
444TC	11.00	9.00	14.50	.81	26.95	26.31	3.38	3.62	20.94	17.38	45.53	8.25	14.000	16.000	7.50	.25	5/8-11	7.25	.88x.88x6.88
444TCS	11.00	9.00	14.50	.81	26.95	26.31	2.38	3.62	20.94	17.38	49.28	4.50	14.000	16.000	7.50	.25	5/8-11	7.25	.62x.62x3.00
445TC	11.00	9.00	16.50	.81	26.95	26.31	3.38	3.62	20.94	17.38	47.53	8.25	14.000	16.000	7.50	.25	5/8-11	8.25	.88x.88x6.88
445TCS	11.00	9.00	16.50	.81	26.95	26.31	2.38	3.62	20.94	17.38	51.28	4.50	14.000	16.000	7.50	.25	5/8-11	8.25	.62x.62x3.00
449TC	11.00	9.00	25.00	.81	27.03	26.31	3.38	4.62	25.90	19.31	55.07	8.25	14.000	16.000	7.50	.25	5/8-11	1.78	.88x.88x6.88
449TCS	11.00	9.00	25.00	.81	27.03	26.31	2.38	4.62	25.90	19.31	58.82	4.50	14.000	16.000	7.50	.25	5/8-11	1.78	.62x.62x3.00

All dimensions are measured in inches. For "C" dimensions, refer to the appropriate catalog page. Certified drawings are available upon request - contact Marathon Electric for details.

# Dimensions

## Blue Max® 2000 Vector Duty

### Totally Enclosed Fan-Cooled (TEFC), Rigid Base



\*Removable cover not shown

FRAME	D	E	2F	H	O (MAX)	P (MAX)	U	AA	AB (MAX)	AC (MAX)	BA	BS	N-W	KEY
213T	5.25	4.25	5.50	.44	11.30	11.50	1.38	1.09	9.31	7.69	4.25	2.75	3.38	.31x.31x2.38
215T	5.25	4.25	7.00	.44	11.30	11.50	1.38	1.09	9.31	7.69	4.25	3.50	3.38	.31x.31x2.38
254T	6.25	5.00	8.25	.53	14.09	14.30	1.62	1.25	10.96	9.32	4.25	4.12	4.00	.38x.38x2.88
256T	6.25	5.00	10.00	.53	14.09	14.30	1.62	1.25	10.96	9.32	4.25	5.00	4.00	.38x.38x2.88
284T	7.00	5.50	9.50	.53	14.90	15.88	1.88	1.50	12.31	9.31	4.75	4.75	4.62	.50x.50x3.25
284TS	7.00	5.50	9.50	.53	14.90	15.88	1.62	1.50	12.31	9.31	4.75	4.75	3.25	.38x.38x1.88
286T	7.00	5.50	11.00	.53	14.90	15.88	1.88	1.50	12.31	9.31	4.75	5.50	4.62	.50x.50x3.25
286TS	7.00	5.50	11.00	.53	14.90	15.88	1.62	1.50	12.31	9.31	4.75	5.50	3.25	.38x.38x1.88
324T	8.00	6.25	10.50	.66	16.00	15.88	2.12	2.00	13.69	10.69	5.25	5.25	5.25	.50x.50x3.88
324TS	8.00	6.25	10.50	.66	16.00	15.88	1.88	2.00	13.69	10.69	5.25	5.25	3.75	.50x.50x2.00
326T	8.00	6.25	12.00	.66	16.00	15.88	2.12	2.00	13.69	10.69	5.25	6.00	5.25	.50x.50x3.88
326TS	8.00	6.25	12.00	.66	16.00	15.88	1.88	2.00	13.69	10.69	5.25	6.00	3.75	.50x.50x2.00
364T	9.00	7.00	11.25	.66	19.00	20.00	2.38	3.62	17.85	14.56	5.88	5.62	5.88	.62x.62x4.25
364TS	9.00	7.00	11.25	.66	19.00	20.00	1.88	3.62	17.85	14.56	5.88	5.62	3.75	.50x.50x2.00
365T	9.00	7.00	12.25	.66	19.00	20.00	2.38	3.62	17.85	14.56	5.88	6.12	5.88	.62x.62x4.25
365TS	9.00	7.00	12.25	.66	19.00	20.00	1.88	3.62	17.85	14.56	5.88	6.12	3.75	.50x.50x2.00
404T	10.00	8.00	12.25	.81	20.88	21.75	2.88	3.62	18.75	14.75	6.62	6.12	7.25	.75x.75x5.62
404TS	10.00	8.00	12.25	.81	20.88	21.75	2.12	3.62	18.75	14.75	6.62	6.12	4.25	.50x.50x2.75
405T	10.00	8.00	13.75	.81	20.88	21.75	2.88	3.62	19.75	16.25	6.62	6.88	7.25	.75x.75x5.62
405TS	10.00	8.00	13.75	.81	20.88	21.75	2.12	3.62	19.75	16.25	6.62	6.88	4.25	.50x.50x2.75
444T	11.00	9.00	14.50	.81	24.19	26.31	3.38	3.62	20.94	17.38	7.50	7.25	8.50	.88x.88x6.88
444TS	11.00	9.00	14.50	.81	24.19	26.31	2.38	3.62	20.94	17.38	7.50	7.25	4.75	.62x.62x3.00
445T	11.00	9.00	16.50	.81	24.19	26.31	3.38	3.62	20.94	17.38	7.50	8.25	8.50	.88x.88x6.88
445TS	11.00	9.00	16.50	.81	24.19	26.31	2.38	3.62	20.94	17.38	7.50	8.25	4.75	.62x.62x3.00
449T	11.00	9.00	25.00	.81	24.22	26.31	3.38	4.62	25.90	19.31	7.50	1.78	8.50	.88x.88x6.88
449TS	11.00	9.00	25.00	.81	24.22	26.31	2.38	4.62	25.90	19.31	7.50	1.78	4.75	.62x.62x3.00

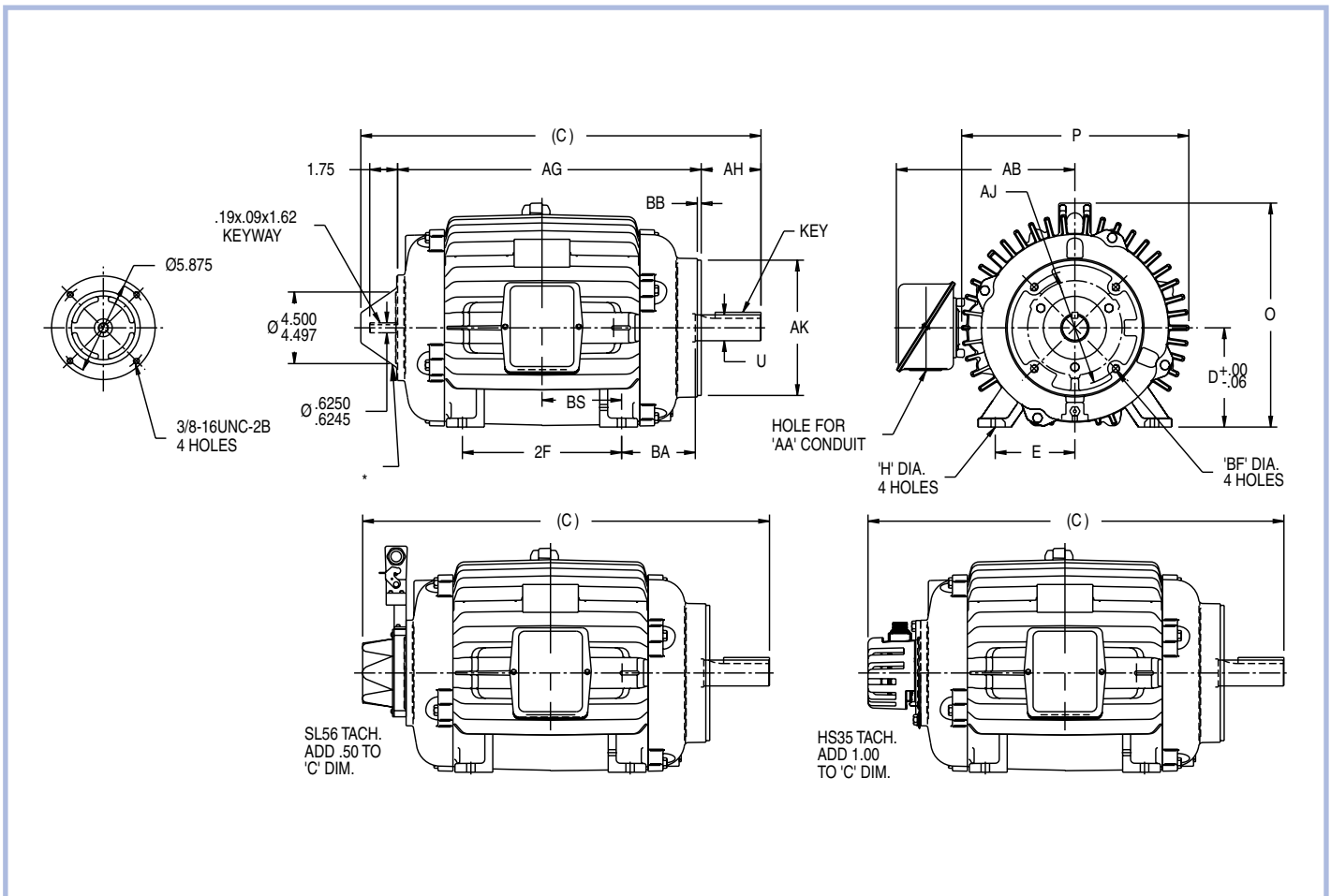
Flange dimensions specific to C-Face rigid base motors on inside back cover

All dimensions are measured in inches. For "C" dimensions, refer to the appropriate catalog page. Certified drawings are available upon request - contact Marathon Electric for details.

# Dimensions

## Blue Max® 2000 Vector Duty

Totally Enclosed Non-Ventilated (TENV), C-Face with Rigid Base



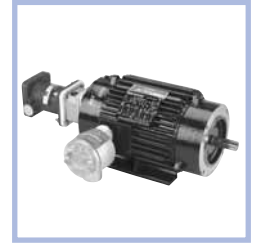
\*Removable cover

FRAME	D	E	2F	H	O MAX.	P MAX.	U	AA	AB MAX.	AG MAX.	AH	AJ	AK	BA	BB	BF	BS	KEY
143TC	3.50	2.75	4.00	.38	7.45	7.98	.875	1.09	7.04	9.25	2.12	5.875	4.500	2.62	.13	3/8-16	2.81	.19x.19x1.38
145TC	3.50	2.75	5.00	.38	7.45	7.98	.875	1.09	7.04	10.25	2.12	5.875	4.500	2.62	.13	3/8-16	3.81	.19x.19x1.38
182TC	4.50	3.75	4.50	.41	9.36	9.76	1.125	1.09	8.08	11.75	2.62	7.250	8.500	3.50	.27	1/2-13	2.25	.25x.25x1.75
184TC	4.50	3.75	5.50	.41	9.36	9.76	1.125	1.09	8.08	12.75	2.62	7.250	8.500	3.50	.27	1/2-13	2.75	.25x.25x1.75
213TC	5.25	4.25	5.50	.44	10.97	11.50	1.375	1.09	9.31	15.12	3.12	7.250	8.500	4.25	.27	1/2-13	3.50	.31x.31x2.38
215TC	5.25	4.25	7.00	.44	10.97	11.50	1.375	1.09	9.31	17.31	3.12	7.250	8.500	4.25	.27	1/2-13	6.18	.31x.31x2.38
254TC	6.25	5.00	8.25	.53	14.09	14.27	1.625	1.25	9.83	19.06	3.75	7.250	8.500	4.75	.27	1/2-13	6.31	.38x.38x2.88
256TC	6.25	5.00	10.00	.53	14.09	14.27	1.625	1.25	10.68	21.07	3.75	7.250	8.500	4.75	.27	1/2-13	4.75	.38x.38x2.88

All dimensions are measured in inches. For "C" dimensions, refer to the appropriate catalog page. Certified drawings are available upon request - contact Marathon Electric for details.

# Blue Max® 2000 Vector Duty, 2000:1 Constant Torque Explosion Proof, Class I Group D (GROUP C AS NOTED), Class II Groups F & G Totally Enclosed Non-Ventilated, C-Face with Rigid Base and Encoder

**Applications:** Designed for industrial applications with Vector Drives where up to a 2000:1 constant torque speed range and/or precise speed or torque regulation is required, including positioning equipment. Used in dirty, dusty or caustic environments where cast iron construction is required, and installed in hazardous environments as defined by the motor's explosion proof class and group rating. Consult the National Electrical Code and your local regulations for the proper selection of motors in hazardous locations.



- Features:**
- BEI H38 explosion proof encoder 1024 ppr, Class I Groups C & D, Class II Groups E, F, G included
  - MAX GUARD® Class F insulation system
  - Constant torque operation from 0 to base speed on vector drive
  - Constant HP operation up to twice base speed
  - Continuous duty at 40° C ambient
  - Optimized for operation with IGBT inverter (NEMA Design A)
  - Normally closed thermostats(one per phase, Class F)
  - Ball bearing
  - Cast iron frame and brackets
  - F1 standard, NOT field reversible to F2
  - UL Listed, temperature code T3C, under file #E12044
  - CSA Certified, under file #LR47504 and #LR21839
  - Three year warranty



See dimensions on next page.

HP	RPM	VOLTS	FRAME	OVER LOAD	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES
<b>1</b>	1800	230/460	143TC	TSTAT	Y978★	143THEN8034	\$5,435	E3	3.0/1.5	84	21.44	CD
<b>2</b>	1800	230/460	145TC	TSTAT	Y979★	145THEN8034	\$5,549	E3	5.8/2.9	90	21.44	CD
<b>3</b>	1800	230/460	182TC	TSTAT	Y980★	182THES8048	\$5,728	E3	8.2/4.1	168	24.82	CD
<b>5</b>	1800	230/460	213TC	TSTAT	Y981★	213THES8053	\$6,026	E3	13.0/6.5	225	27.42	CD
<b>7 1/2</b>	1800	230/460	254TC	TSTAT	Y982★	254THEN8058	\$6,853	E3	25.0/12.5	260	30.20	CD
<b>10</b>	1800	230/460	254TC	TSTAT	Y983★	254THEN8059	\$7,180	E3	27.0/13.5	390	30.20	CD
<b>15</b>	1800	230/460	256TC	TSTAT	Y984	256THEN17031	\$5,416	E3	36/18	450	31.95	CD
<b>20</b>	1800	230/460	284TC	TSTAT	Y985	284THEN8032	\$8,285	E3	57.6/28.8	555	33.16	CD

Blue shaded areas are cast iron frames.

★ Stock Model

BlueMax®

**Footnotes:**

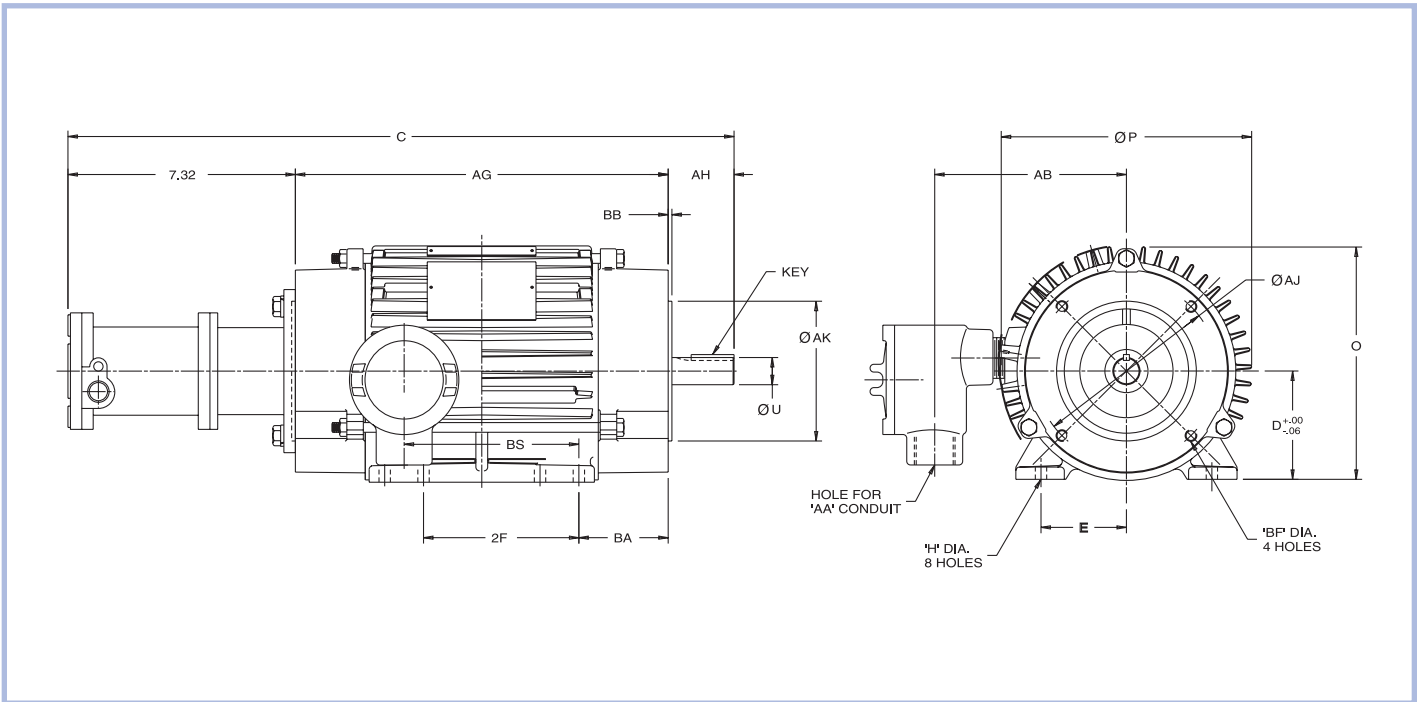
CD Suitable for Group C

# Dimensions

## Blue Max® 2000 Vector Duty

### Explosion Proof, Class I Groups C & D, Class II Groups F & G

Totally Enclosed Non-Ventilated, C-Face with Rigid Base and Encoder



FRAME	D	E	2F	H	O MAX.	P MAX.	U	AA	AB MAX.	AG MAX.	AH	AJ	AK	BA	BB	BF	BS	KEY
143TC	3.50	2.75	4.00	.34	7.48	8.06	.875	.50	8.25	12.00	2.12	5.875	4.500	2.88	.13	3/8 - 16	5.62	.19 X .19 X 1.39
145TC	3.50	2.75	5.00	.34	7.48	8.06	.875	.50	8.25	12.00	2.12	5.875	4.500	2.88	.13	3/8 - 16	5.62	.19 X .19 X 1.39
182TC	4.50	3.75	4.50	.41	11.61	9.76	1.125	.75	9.34	14.94	2.62	7.250	8.500	3.50	.27	1/2 - 13	2.75	.25 X .25 X 1.75
213TC	5.25	4.25	5.50	.41	13.62	11.5	1.375	.75	10.94	16.98	3.12	7.250	8.500	4.25	.28	1/2 - 13	4.12	.31 X .31 X 2.38
254TC	6.25	5.00	8.25	.53	14.09	14.27	1.625	1.25	13.67	18.25	3.75	7.250	8.500	4.75	.28	1/2 - 13	4.12	.38 X .38 X 2.88
284TC	7.00	5.50	9.50	.53	15.57	15.89	1.8275	1.50	16.44	21.46	4.38	9.000	10.500	4.75	.27	1/2 - 13	4.75	.50 X .50 X 3.25

BlueMax®

All dimensions are measured in inches. For "C" dimensions, refer to the appropriate catalog page. Certified drawings are available upon request - contact Marathon Electric for details.

# Blue Max® Vector Duty, 2000:1 Constant Torque Brakemotors

## Totally Enclosed Non-Ventilated, C-Face with Rigid Base

**Applications:** Designed for industrial applications with Vector Drives where up to a 2000:1 constant torque speed range and/or precise speed or torque regulation is required, including positioning equipment. Used in dirty, dusty or caustic environments where cast iron construction is required. Brakemotors are utilized in applications requiring braking action faster than coast down, including holding overhauling loads.



- Features:**
- MAX GUARD® Class F insulation system
  - Constant torque operation from 0 to base speed on vector drive
  - Constant HP operation up to twice base speed
  - Continuous duty at 40° C ambient
  - Optimized for operation with IGBT inverter (NEMA Design A)
  - Normally closed thermostats (one per phase, Class F)
  - Ball bearing
  - Cast iron frame and brackets
  - Includes 140% rated spring-set self-adjusting NEMA 2 disk brake (brake coil voltage matches motor)
  - Horizontal mounting (see comment below and MOD Central for vertical mounting)
  - UL Recognized, CSA Certified, and CE Marked
  - Three year warranty (brake disks exempt)



See dimensions on next page.

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	F.L. AMPS	BRAKE TQ (LB-FT)	APPROX. WGT. LBS.	"C" DIM.
1	1800	230/460	143TC	Y986★	143THTN8036	\$1,696	E3	3.0/1.5	6	67	17.00
2	1800	230/460	145TC	Y987★	145THTN8043	\$1,889	E3	6.0/3.0	10	77	18.00
3	1800	230/460	182TC	Y988★	182THTS8048	\$2,473	E3	8.2/4.1	15	120	19.67
5	1800	230/460	184TC	Y989★	184THTS8056	\$2,981	E3	13.4/6.7	25	145	25.58
7 1/2	1800	230/460	213TC	Y990★	213THTS8071	\$3,736	E3	21.0/10.5	35	226	27.58
10	1800	230/460	215TC	Y991★	215THTS8071	\$4,440	E3	26.0/13.0	50	332	28.83
15	1800	230/460	254TC	Y992★	254THTNA8071	\$5,642	E3	40.5/20.2	75	350	31.53
20	1800	230/460	256TC	Y993★	256THTNA8071	\$7,478	E3	52.0/26.0	105	390	35.28

Blue shaded areas are cast iron frames. ★ Stock Model

For more information about brakes, see next page for technical Brake Data.

### 1024 ppr Encoders through MOD Central

Multiplier Symbol E3

BRAND	MODEL	CAT. NO.	KIT NUMBER	LIST KIT ONLY	LIST INSTALLED	FITS BRAKEMOTOR CAT. NO.
Avtron	M56	A748★	KIT M561024BRK-140	\$2,038	\$2,338	Y986, Y987
		A749★	KIT M561024BRK-182	\$2,038	\$2,338	Y988
	M85	A750★	KIT M851024BRK-184	\$2,750	\$3,050	Y989
		A751★	KIT M851024BRK-210	\$2,750	\$3,050	Y990, Y991
		A752★	KIT M851024BRK-250	\$2,750	\$3,050	Y992, Y993
NorthStar	SL56	A786★	KIT LKSR-CFACE	\$2,241	\$2,541	Y986, Y987
		A789★	KIT SL561024-182NV	\$2,241	\$2,541	Y988
	SL85	A790★	KIT SL851024-184NV	\$2,750	\$3,050	Y989
		A791★	KIT SL851024-210NV	\$2,750	\$3,050	Y990, Y991
		A792★	KIT SL851024-250NV	\$2,750	\$3,050	Y992, Y993

★ Stock Model

Vertical Mounting: 5 HP (184) and lower are suitable for shaft up or down.

7-1/2HP (213) and larger, need vertical modification Cat #:A157, KIT VRT87BRK (SEE MOD SECTION)

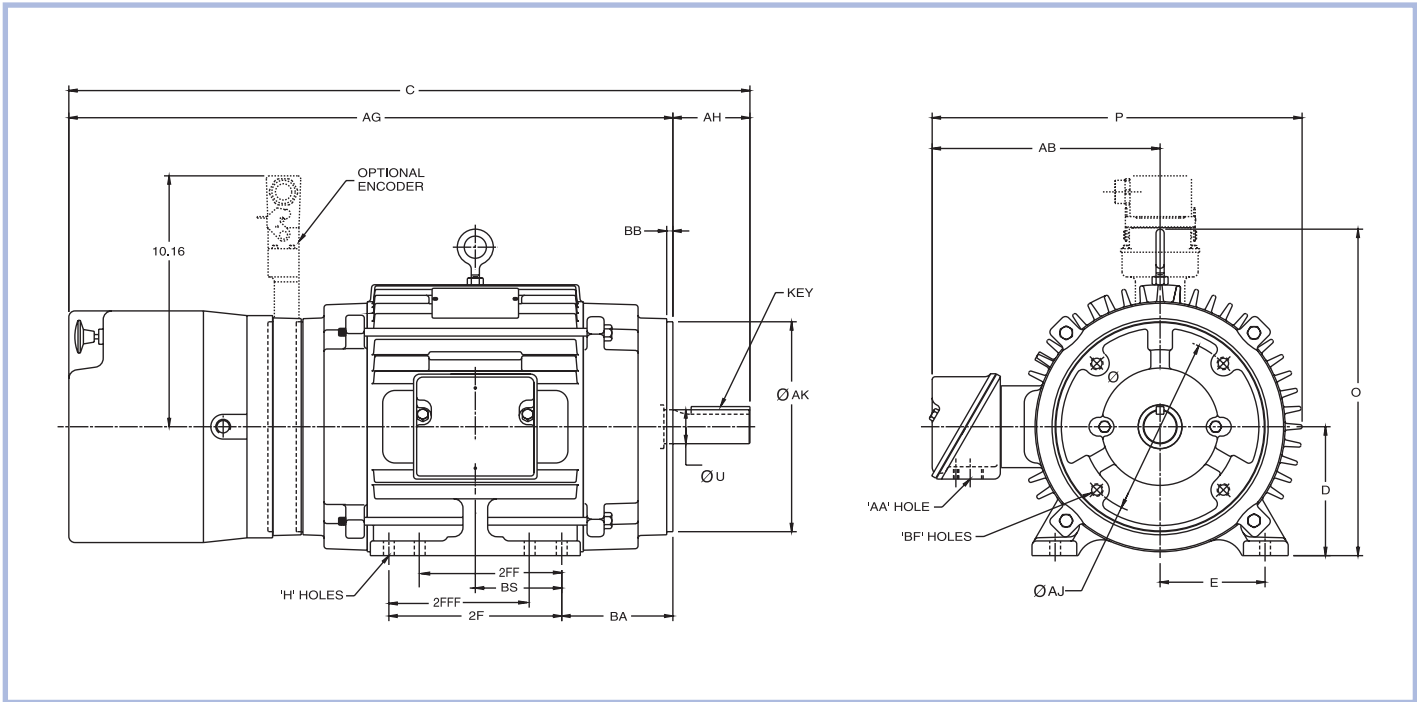
CAT. NO.	MODEL NO.	LIST KIT ONLY	LIST INSTALLED
A157	KIT VRT87BRK	\$375	\$493

# Dimensions

## Blue Max® 2000 Vector Duty

### Totally Enclosed Non-Ventilated Brakemotors

#### C-Face with Rigid Base



FRAME	D	E	2F	2FF	2FFF	H	O MAX.	P MAX.	U	AA	AB MAX.	AG MAX.	AH	AJ	AK	BA	BB	BF	BS	KEY
143TC	3.50	2.75	4.00	-	-	.44	7.45	10.96	.875	3/4	6.91	14.88	2.12	5.875	4.500	2.62	.13	3/8-16	2.81	.19x.19x1.38
145TC	3.50	2.75	5.00	-	-	.44	7.45	10.96	.875	3/4	6.91	15.88	2.12	5.875	4.500	2.62	.13	3/8-16	3.81	.19x.19x1.38
182TC	4.50	3.75	4.50	-	-	.44	11.61	12.89	1.125	3/4	8.01	17.05	2.62	7.250	8.500	3.50	.27	1/2-13	2.25	.25x.25x1.75
184TC	4.50	3.75	5.50	-	-	.44	11.70	12.91	1.125	3/4	8.00	22.96	2.62	7.250	8.500	3.50	.27	1/2-13	3.38	.25x.25x1.75
213TC	5.25	4.25	7.00	5.50	5.50	.44	13.22	15.05	1.375	3/4	9.30	24.46	3.12	7.250	8.500	4.25	.27	1/2-13	3.50	.31x.31x2.38
215TC	5.25	4.25	8.25	7.00	7.00	.44	13.22	15.05	1.375	3/4	9.30	25.71	3.12	7.250	8.500	4.25	.27	1/2-13	4.75	.31x.31x2.38
254TC	6.25	5.00	10.00	-	-	.56	14.09	19.15	1.625	1 1/4	10.87	29.53	3.75	7.250	8.500	4.12	.27	1/2-13	4.12	.38x.38x2.88
256TC	6.25	5.00	10.00	10.00	10.00	.56	16.49	18.81	1.625	1 1/4	11.65	31.53	3.75	7.250	8.500	4.75	.27	1/2-13	4.75	.38x.38x2.88

All dimensions are measured in inches. For "C" dimensions, refer to the appropriate catalog page. Certified drawings are available upon request - contact Marathon Electric for details.

### Brake Data - Stock Motors

Nominal Static Torque	Coil Size	Amperage				Stearns Series	Optional Space Heater		
		Inrush	115	230	460		Voltage	Watts	
1.5	4	Inrush	3.6	1.8	0.9	56,000	115V	30	
3		Holding	0.3	0.2	0.08				
6	K4	Inrush	4.3	2.2	1.1		87,000	230V	30
10		Holding	0.3	0.2	0.08				
15	6	Inrush	13	6.5	3.2	87,000		115V	30
25		Holding	0.6	0.3	0.2				
50	8	Inrush	17.6	8.8	4.2		87,000	230V	30
35		Holding	1.2	0.6	0.3				
75	8	Inrush	17.6	8.8	4.2	87,000		230V	30
105		Holding	1.2	0.6	0.3				

See Brake selection and pricing page for "Buildup" Brakemotors



## Dripproof, Force Ventilated



- 364T-6805 Frame
- Cast Iron construction, F1 assembly
- Class F Max Guard insulation
- 2000:1 Constant Torque, 1.0 SF
- 1-1/2 times Base RPM Constant HP (Wide CHP designs available)
- Class F normally-closed thermostats
- Continuous duty, 40° C ambient
- Encoder & provisions extra
- Shaft Grounding Brush (444T & larger)
- Filter included
- Three year warranty

## Totally Enclosed, Non Ventilated



- 143T-5013 Frame
- Cast Iron construction, F1 assembly
- Class F Max Guard insulation
- 2000:1 Constant Torque, 1.0 SF
- 1-1/2 times Base RPM Constant HP (Wide CHP designs available)
- Class F normally-closed thermostats
- Continuous or 60 minute duty, 40° C
- Encoder & provisions extra
- Shaft Grounding Brush (444T & larger)
- Three year warranty

## Brakemotors (TENV, TEFC, TEBC)



- 143T-5013 Frame
- Cast Iron construction, F1 assembly
- Class F Max Guard insulation
- 50%, 100% and 140% brakes available
- NEMA 2, 4 and 4X brakes available
- Up to 2000:1 CT; 1-1/2 times base CHP, 1.0 SF
- Class F normally-closed thermostats
- Continuous or 60 Minute duty, 40° C
- Sandwich or integrated encoder available
- Shaft Grounding Brush (444T & larger)
- Three year warranty

## Totally Enclosed, Blower Cooled



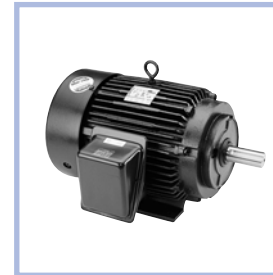
- 213T-5013 Frame (standard axial blower)
- 284T-5013 Frame (opt radial blower)
- Cast Iron construction, F1 assembly
- Class F Max Guard insulation
- 2000:1 Constant Torque, 1.0 SF
- 1-1/2 times Base RPM Constant HP (Wide CHP designs available)
- Class F normally-closed thermostats
- Continuous duty, 40° C ambient
- Encoder extra; provisions included
- Shaft Grounding Brush (444T & larger)
- Three year warranty

## Explosion Proof



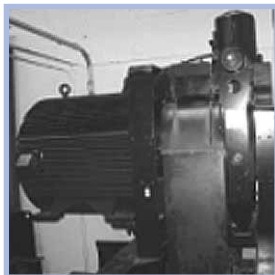
- 143T-449T Frame
- Cast Iron construction, F1 assembly
- Class F Max Guard insulation
- 2000:1 CT (EPNV); 20:1 CT (EPFC), 1.0 SF
- 1-1/2 times Base RPM Constant HP
- Class F normally-closed thermostats
- Continuous duty, 40° C ambient
- Encoder & provisions extra
- Division 1 (Zone 1) Class I and II
- Shaft Grounding Brush N/A per U.L.
- Three year warranty

## Totally Enclosed, Fan Cooled



- 143T-5013 Frame
- Cast Iron construction, F1 assembly
- Class F Max Guard insulation
- Up to 2000:1 Constant Torque, 1.0 SF
- 1-1/2 times Base RPM Constant HP
- Class F normally-closed thermostats
- Continuous duty, 40° C ambient
- Encoder & provisions extra
- Shaft Grounding Brush (444T & larger)
- Three year warranty

## Applications



- Elevators
- Crane & Hoist
- Material Handling
- Recoilers
- Unwinders
- Slitters
- Conveyors
- Pumps
- Compressors



- Air Handlers
- Air Conditioning
- Rail Grinding
- Milling
- Oil and Gas extraction
- People movers
- Mining
- Line shafts
- Sewage treatment



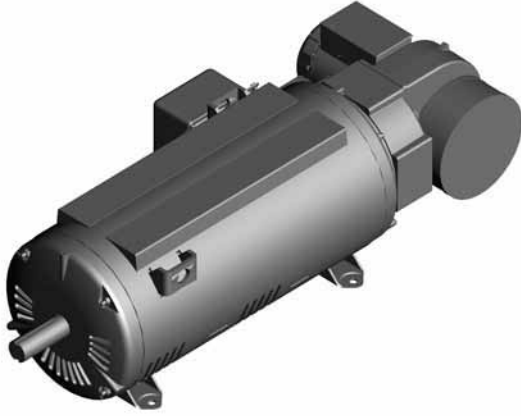
- Paint sprayers
- Sorting equipment
- Pick and place
- Storage and retrieval systems
- Farm machinery
- Printing
- Plastic extrusion
- Metal forming
- Fabrication



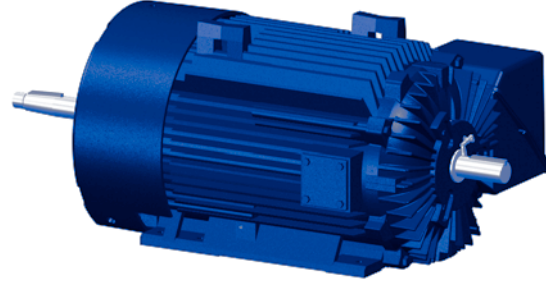
- Construction equipment
- Bottling lines
- Food and beverage processing
- Woodworking
- Commercial laundry equipment
- Transportation equipment
- Choppers
- Winches
- Bow thrusters

# Specials Are Our Specialty

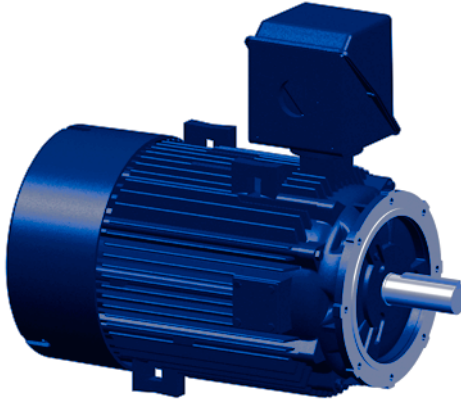
**3212 DPFV**  
Rolled Steel, Force Ventilated



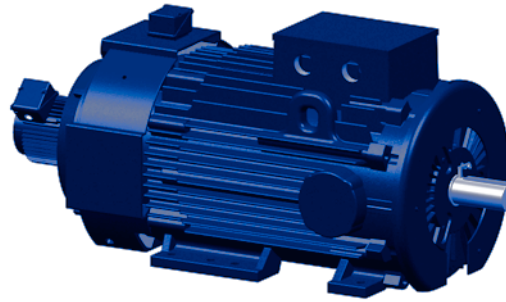
**440TCZ TEFC**  
Cast Iron, Tapered ODE shaft, F2



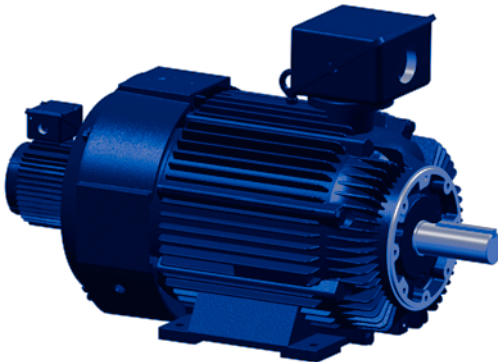
**440TD TEFC Round**  
Cast Iron, Round, D-Flange



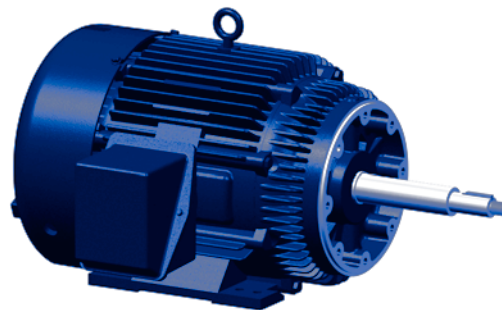
**280 IEC TEBC**  
Blower Cooled, Ground Brush, F3



**400TC TEBC**  
Blower Cooled, C-Face, F3



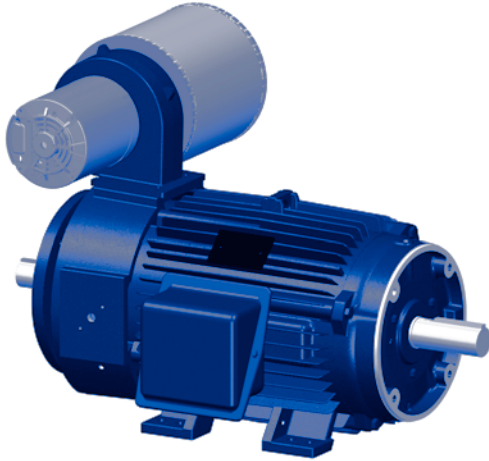
**320TCZ TEFC**  
Special Shaft, C-Face



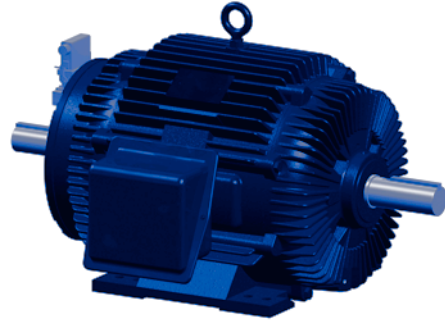
FACTORY BUILD-UP MOTORS

# Specials Are Our Specialty

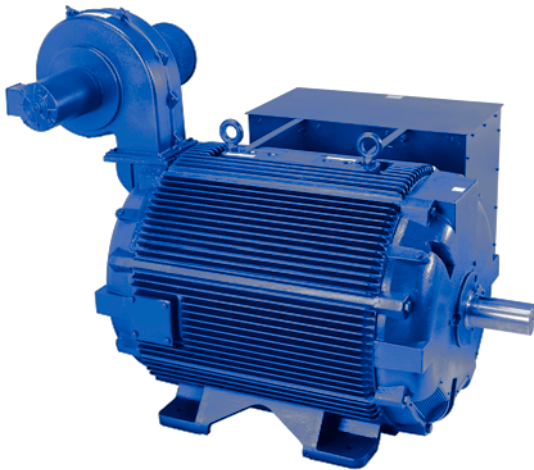
**320 TCZ TEBC**  
Blower Cooled, Special ODE shaft, C-Face



**320 TZ TENV**  
Non Ventilated, Special ODE Shaft, Encoder



**6805 DPFV**  
Cast Iron, Force Ventilated, F2



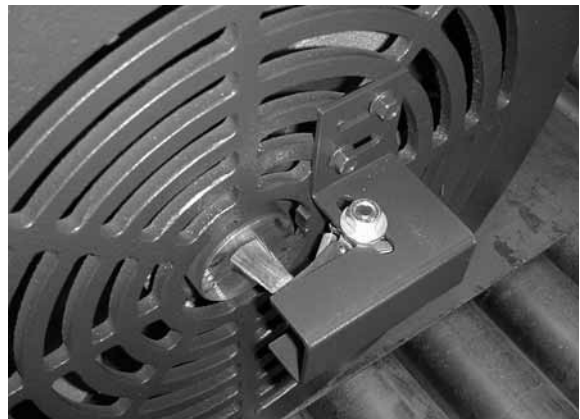
**132 MFFZ**  
Cast Iron, Round, FF Flange, F4



**Marathon's "IntelliBrake"**  
Stearns & Dings Brakes  
with Integrated Encoder



**Ground Brush**  
Opposite Drive End



FACTORY BUILD-UP MOTORS

# Blue Max® 2000 Vector Duty Factory Build-Up Motors

Multiplier Symbol E3

HP	RPM	DRIPPROOF, FORCE VENTILATED 2000:1 Constant Torque			TOTALLY ENCLOSED, NON-VENTILATED								
					CONTINUOUS DUTY 2000:1 Constant Torque			60 MINUTE DUTY 2000:1 Constant Torque					
		FRAME	LIST	460v FLA	FRAME	LIST	460v FLA	FRAME	LIST	460v FLA			
<b>1</b>	3600	N/A			143T	\$1,146	1.5	143T	\$1,042	1.5			
	1800				143T	\$1,042	1.5						
	1200				145T	\$1,152	1.7				145T	\$1,152	1.7
	900				184T	\$1,717	2.5						
<b>1 1/2</b>	3600	N/A			145T	\$1,152	2.0	145T	\$1,048	2.3			
	1800				145T	\$1,048	2.3						
	1200				184T	\$1,334	2.2				184T	\$1,334	2.9
	900				213T	\$2,413	3.6						
<b>2</b>	3600	N/A			145T	\$1,185	2.7	145T	\$1,129	3.0			
	1800				145T	\$1,129	3.0						
	1200				184T	\$1,809	3.0				184T	\$1,809	3.2
	900				213T	\$2,565	3.8						
<b>3</b>	3600	N/A			182T	\$1,560	3.7	182T	\$1,418	4.3			
	1800				182T	\$1,418	4.0						
	1200				213T	\$2,443	4.5				213T	\$2,443	4.5
	900				254T	\$4,514	4.6						
<b>5</b>	3600	N/A			184T	\$2,232	6.2	184T	\$1,585	6.7			
	1800				184T	\$1,585	6.7						
	1200				215T	\$3,446	7.0				215T	\$2,543	8.0
	900				256T	\$4,930	7.6						
<b>7 1/2</b>	3600	N/A			213T	\$2,566	9.5	213T	\$1,854	10.0			
	1800				213T	\$2,135	10.5						
	1200				254T	\$4,299	12.0				254T	\$3,057	11.0
	900				284T	\$5,800	11.0						
<b>10</b>	3600	N/A			215T	\$3,184	12.0	215T	\$2,216	13.0			
	1800				215T	\$2,533	13.0						
	1200				256T	\$4,695	15.5				256T	\$3,481	14.0
	900				286T	\$8,636	17.0						
<b>15</b>	3600	N/A			256T	\$4,302	18.0	254T	\$2,669	19.9			
	1800				254T	\$3,032	20.2						
	1200				284T	\$5,523	20.4				284T	\$4,057	20.5
	900				324T	\$9,796	26.0						
<b>20</b>	3600	N/A			286T	\$4,726	23.5	256T	\$3,474	26.0			
	1800				256T	\$4,197	26.0						
	1200				326T	\$8,225	29.5				286T	\$4,637	26.0
	900				365T	\$10,800	28.0						
<b>25</b>	3600	N/A			286TS	\$4,928	28.0	284T	\$3,688	31.5			
	1800				284T	\$4,480	31.0						
	1200				364T	\$9,796	31.0				324T	\$6,005	33.0
	900				404T	\$12,790	33.0						

FACTORY BUILD-UP MOTORS

# Blue Max® 2000 Vector Duty Factory Build-Up Motors

Multiplier Symbol E3

HP	RPM	DRIPPROOF, FORCE VENTILATED 2000:1 Constant Torque			TOTALLY ENCLOSED, NON-VENTILATED					
					CONTINUOUS DUTY 2000:1 Constant Torque			60 MINUTE DUTY 2000:1 Constant Torque		
		FRAME	LIST	460v FLA	FRAME	LIST	460v FLA	FRAME	LIST	460v FLA
<b>30</b>	3600	N/A								
	1800	N/A			326T	\$6,956	40.0	286T	\$4,216	40.0
	1200	N/A			365T	\$12,181	42.0	326T	\$7,429	40.5
	900	364T	\$9,123	44.0	405T	\$17,339	40.0			
<b>40</b>	3600	N/A								
	1800	N/A			364T	\$8,965	48.0	324T	\$5,459	50.0
	1200	364T	\$9,603	52.0	405T	\$16,852	48.5	364T	\$9,574	51.0
	900	365T	\$10,485	53.0	444T	\$20,330	56.0			
<b>50</b>	3600	N/A								
	1800	N/A			367T	\$11,417	59.5	326T	\$6,753	63.0
	1200	365T	\$11,036	64.0	444T	\$19,361	61.5	365T	\$11,960	65.0
	900	404T	\$12,004	68.0	445T	\$24,181	70.0			
<b>60</b>	3600	N/A								
	1800	364T	\$7,961	72.0	405T	\$13,744	68.0	364T	\$8,704	75.0
	1200	404T	\$12,637	71.5	445T	\$23,029	73.0	404T	\$13,319	76.0
	1200	3212	\$21,090	83.0						
	900	405T	\$18,574	80.0	445T	\$25,332	85.0			
<b>75</b>	3600	N/A								
	1800	365T	\$9,516	90.0	444T	\$17,872	87.0	365T	\$9,861	90.0
	1800	3212	\$20,040	91.0						
	1200	405T	\$13,971	93.0	445T	\$24,181	105	405T	\$14,678	95.0
	1200	3212	\$22,145	100						
	900	444T	\$20,026	95.0	449T	\$40,230	110			
<b>100</b>	3600	N/A								
	1800	404T	\$14,108	118	445T	\$20,667	110	405T	\$13,343	117
	1800	3212	\$21,090	118						
	1200	444T	\$18,324	118	449T	\$38,313	124	444T	\$19,086	125
	1200	3212	\$23,200	137						
	900	445T	\$22,428	128	449T	\$44,408	135			
<b>125</b>	3600	N/A								
	1800	405T	\$16,569	148	445T	\$24,118	158	444T	\$17,351	146
	1800	3212	\$22,140	138						
	1200	445T	\$20,512	147	449T	\$42,294	154	445T	\$22,072	155
	1200	3212	\$25,520	164						
	900	447T	\$29,483	172	5011	\$65,638	178			
<b>150</b>	3600	N/A								
	1800	444T	\$18,344	176	449T	\$31,184	173	445T	\$20,065	166
	1800	3212	\$23,200	175						
	1200	445T	\$24,132	177	449T	\$45,253	205	445T	\$26,689	186
	900	447T	\$31,547	210	5011	\$71,732	210			

FACTORY BUILD-UP MOTORS

# Blue Max® 2000 Vector Duty Factory Build-Up Motors

Multiplier Symbol E3

HP	RPM	DRIPPROOF, FORCE VENTILATED			TOTALLY ENCLOSED, NON-VENTILATED					
		2000:1 Constant Torque			CONTINUOUS DUTY			60 MINUTE DUTY		
		FRAME	LIST	460v FLA	2000:1 Constant Torque			2000:1 Constant Torque		
				FRAME	LIST	460v FLA	FRAME	LIST	460v FLA	
<b>200</b>	3600	N/A			L449T	\$35,536	260	445T	\$24,264	226
	1800	445T	\$21,385	228						
	1200	449T	\$26,813	236						
	900	449T	\$33,754	270						
<b>250</b>	3600	N/A				N/A		449T	\$30,275	280
	1800	447T	\$25,979	290						
	1200	449T	\$28,690	298						
	900	508U	\$39,688	325						
<b>300</b>	1800	447T	\$28,260	332		N/A	449T	\$34,501	330	
	1200	449T	\$35,381	340						
	900	508U	\$43,657	375						
<b>350</b>	1800	447T	\$31,278	405		N/A	L449T	\$43,327	386	
	1200	449T	\$37,857	412						
	900	510U	\$48,022	430						
<b>400</b>	1800	447T	\$34,219	460		N/A	L449T	\$51,992	460	
	1200	508U	\$52,933	460						
	900	6805	\$88,651	495						
<b>450</b>	1800	449T	\$36,909	510		N/A	5011	\$65,421	520	
	1200	6805	\$70,993	545						
	900	6805	\$90,461	585						
<b>500</b>	1800	449T	\$39,688	545		N/A	5011	\$81,474	555	
	1200	6805	\$72,730	580						
	900	6805	\$97,697	615						
<b>600</b>	1800	6805	\$58,999	640		N/A	5013	\$97,768	680	
	1200	6805	\$75,987	690						
	900	6805	\$116,513	730						
<b>650</b>	1800	6805	\$63,974	695		N/A	5013	\$105,590	750	
	1200	6805	\$76,891	755						
<b>700</b>	1800	6805	\$69,474	790		N/A		N/A		
	1800	6805	\$72,368	790						
	1200	6805	\$77,796	810						
<b>750</b>	1800	6805	\$85,938	850		N/A		N/A		
	1200	6805	\$90,461	875						
<b>800</b>	1800	6805	\$99,507	890		N/A		N/A		
	1200	6805	\$113,257	910						
<b>900</b>	1800	6805	\$104,934	1000		N/A		N/A		
	1200	6805	\$116,875	1010						
<b>1000</b>	1800	6805	\$113,980	1100		N/A		N/A		
<b>1250</b>	1800	6805	\$119,408	1350		N/A		N/A		

FACTORY BUILD-UP MOTORS

# Blue Max® 2000 Vector Duty Factory Build-Up Motors

Multiplier Symbol E3

HP	RPM	TOTALLY ENCLOSED, FAN COOLED 2000:1 Constant Torque				TOTALLY ENCLOSED, BLOWER COOLED 2000:1 Constant Torque			EXPLOSION PROOF, NON-VENTILATED* 2000:1 Constant Torque		
		FRAME	LIST	460v FLA	FOOTNOTES	FRAME	LIST	460v FLA	FRAME	LIST	460v FLA
<b>1</b>	3600	USE TENV DATA				USE TENV DATA			143T	\$1,819	1.5
	1800								145T	\$1,844	1.7
	1200										
	900										
<b>1 1/2</b>	3600	USE TENV DATA				USE TENV DATA			145T	\$1,900	2.2
	1800								184T	\$2,000	3.2
	1200										
	900								213T	\$3,553	3.6
<b>2</b>	3600	USE TENV DATA				USE TENV DATA			145T	\$1,938	2.9
	1800								184T	\$2,052	3.2
	1200										
	900								213T	\$3,629	4.0
<b>3</b>	3600	USE TENV DATA				USE TENV DATA			182T	\$2,125	4.1
	1800								213T	\$3,584	4.5
	1200								254T	\$5,759	5.0
	900								215T	\$2,931	5.0
<b>5</b>	3600	USE TENV DATA				USE TENV DATA			213T	\$2,436	6.5
	1800								254T	\$2,785	7.2
	1200								215T	\$2,543	6.9
	900								254T	\$3,210	8.5
<b>7 1/2</b>	3600	USE TENV DATA				USE TENV DATA			213T	\$3,333	9.5
	1800								213T	\$2,995	9.7
	1200								254T	\$4,302	11.0
	900								256T	\$6,753	12.0
<b>10</b>	3600	USE TENV DATA				USE TENV DATA			215T	\$3,684	12.0
	1800								215T	\$3,356	12.7
	1200								256T	\$4,726	13.5
	900								284T	\$7,415	15.5
<b>15</b>	3600	USE TENV DATA				USE TENV DATA			254T	\$4,302	18.0
	1800								254T	\$3,914	18.5
	1200								284T	\$5,949	22.0
	900								286T	\$8,075	22.0
<b>20</b>	3600	USE TENV DATA				USE TENV DATA			256T	\$4,726	23.4
	1800								256T	\$4,197	26.0
	1200								286T	\$7,690	27.0
	900								324T	\$9,499	32.0
<b>25</b>	3600	USE TENV DATA				USE TENV DATA			284TS	\$5,523	29.0
	1800								284T	\$5,154	31.5
	1200								324T	\$9,046	33.0
	900								364T	\$10,449	35.5

\* Specify Class and Group

FACTORY BUILD-UP MOTORS

# Blue Max® 2000 Vector Duty Factory Build-Up Motors

Multiplier Symbol E3

HP	RPM	TOTALLY ENCLOSED, FAN COOLED 2000:1 Constant Torque				TOTALLY ENCLOSED, BLOWER COOLED 2000:1 Constant Torque			EXPLOSION PROOF, NON-VENTILATED* 2000:1 Constant Torque			
		FRAME	LIST	460v FLA	FOOTNOTES	FRAME	LIST	460v FLA	FRAME	LIST	460v FLA	
<b>30</b>	3600	<b>Contact Engineering</b>					286TS	\$6,104		35.0		
	1800	286T	\$4,216	38.5		286T	\$5,682	38.5	326T	\$9,890	40.0	
	1200	326T	\$7,429	41.0		326T	\$9,951	41.0	365T	\$15,902	41.5	
	900	364T	\$10,053	44.0		364T	\$12,605	44.0				
<b>40</b>	3600	<b>Contact Engineering</b>				324TS	\$7,730	45.5				
	1800	324T	\$5,459	50.0		324T	\$6,807	50.0	364T	\$13,678	48.0	
	1200	364T	\$9,574	52.0		364T	\$12,004	52.0	405T	\$20,761	48.5	
	900	365T	\$12,557	56.0		365T	\$15,109	56.0				
<b>50</b>	3600	<b>Contact Engineering</b>					326TS	\$9,155		57.0		
	1800	326T	\$6,753	60.5		326T	\$7,803	60.5	405T	\$21,847	57.0	
	1200	365T	\$11,960	62.0		365T	\$14,390	62.0	444T	\$31,085	62.5	
	900	404T	\$13,984	69.0		404T	\$16,761	69.0				
<b>60</b>	3600	<b>Contact Engineering</b>				364TS	\$11,783	67.0				
	1800	364T	\$8,704	74.0		364T	\$9,553	74.0	405T	\$22,174	68.0	
	1200	404T	\$13,319	71.0		404T	\$15,963	71.0	445T	\$33,815	74.0	
	900	405T	\$15,412	80.0		405T	\$20,422	80.0				
<b>75</b>	3600	<b>Contact Engineering</b>					365TS	\$14,168		84.0		
	1800	365T	\$9,861	92.0		365T	\$11,420	92.0	444T	\$30,872	86.0	
	1200	405T	\$14,678	95.0		405T	\$19,450	95.0	445T	\$35,180	91.0	
	900	444T	\$20,040	108		444T	\$23,220	107				
<b>100</b>	3600	<b>Contact Engineering</b>				405TS	\$17,276	112				
	1800	405T	\$13,343	115		405T	\$15,941	115	445T	\$35,371	112	
	1200	444T	\$19,086	125		444T	\$22,114	125	449T	\$39,438	124	
	900	445T	\$23,175	142		445T	\$27,072	142		N/A		
<b>125</b>	3600	<b>Contact Engineering</b>				444TS	\$21,839	148		N/A		
	1800	444T	\$17,351	143		444T	\$20,104	143	449T	\$36,854	139	
	1200	445T	\$22,072	153		445T	\$25,782	153	449T	\$39,777	153	
	900	449T	\$28,024	172		445T	\$31,205	172		N/A		
<b>150</b>	3600	<b>Contact Engineering</b>				445TS	\$24,825	168		N/A		
	1800	445T	\$20,065	170		445T	\$22,818	170	449T	\$40,273	167	
	1200	449T	\$26,689	192		445T	\$29,719	186		N/A		
	900	449T	\$34,967	202		449T	\$44,028	218		N/A		
<b>200</b>	3600	<b>Contact Engineering</b>				449TS	\$30,308	226				
	1800	445T	\$24,264	230		445T	\$27,017	230		N/A		
	1200	449T	\$33,303	240		449T	\$41,932	240				
	900	5011	\$68,316	275	2:1	449T	\$47,647	275				

\* Specify Class and Group

Footnotes:  
2:1 2:1 Constant Torque

FACTORY BUILD-UP MOTORS



# Blue Max® 2000 Vector Duty Factory Build-Up Motors

Multiplier Symbol E3

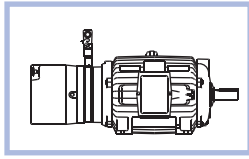
HP	RPM	TOTALLY ENCLOSED, FAN COOLED 2000:1 Constant Torque				TOTALLY ENCLOSED, BLOWER COOLED 2000:1 Constant Torque			EXPLOSION PROOF, NON-VENTILATED* 2000:1 Constant Torque			
		FRAME	LIST	460v FLA	FOOTNOTES	FRAME	LIST	460v FLA	FRAME	LIST	460v FLA	
<b>250</b>	3600	<b>Contact Engineering</b>				449TS	\$36,921	274	N/A			
	1800	449T	\$30,275	295		449T	\$33,893	295				
	1200	449T	\$41,932	302		449T	\$45,912	302				
	900	5011	\$74,322	340	2:1	5011	\$77,941	340				
<b>300</b>	1800	449T	\$34,501	327		449T	\$38,119	327	N/A			
	1200	L449T	\$81,112	362	2:1	449T	\$54,715	362				
	900	5013	\$98,104	420	2:1	5013	\$101,723	420				
<b>350</b>	1800	L449T	\$69,482	386		449T	\$41,738	386	N/A			
	1200	5011	\$89,099	415	2:1	5011	\$84,730	415				
	900		N/A			5013	\$113,048	458				
<b>400</b>	1800	5011	\$81,474	444	2:1	449T	\$50,070	450	N/A			
	1200	5011	\$94,412	485	2:1	5011	\$92,717	485				
	900		N/A			5013	\$124,329	522				
<b>450</b>	1800	5011	\$89,621	510	2:1	5011	\$85,092	510	N/A			
	1200		N/A			5011	\$109,119	522				
<b>500</b>	1800	5013	\$119,919	570	2:1	5011	\$89,556	570	N/A			
	1200		N/A			5013	\$119,783	590				
<b>600</b>	1800		N/A			5013	\$114,546	660	N/A			
<b>650</b>	1800		N/A			5013	\$125,704	R.T.M.	N/A			
<b>700</b>	1800		N/A			5013	\$136,862	R.T.M.	N/A			

\* Specify Class and Group

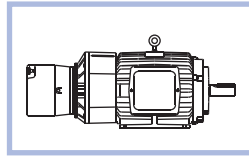
**Footnotes:**

2:1 2:1 Constant Torque

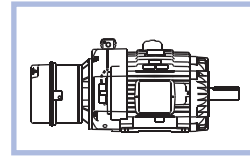
# Blue Max® 2000 Vector Duty Factory Build-Up Brakemotors (non-Explosion Proof)



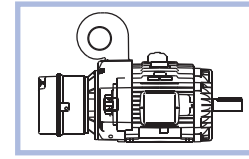
A



B



C



D

Multiplier Symbol E3

HP	RPM	FRAME	ENCL.	STANDARD NEMA 2 BRAKE	SEVERE NEMA 4 BRAKE	460 VOLT FLA	BRAKE TQ. (LB-FT)	REF DRWG	OPTIONAL ENCODERS#		
									SL56, M56	SL85, M85	HS20*
1	1800	143T	TENV	\$1,626	\$1,893	1.5	6	A, B	\$2,038		\$2,800
	1200	145T	TENV	\$1,735	\$2,003	1.7	6	A, B	\$2,038		\$2,800
1 1/2	1800	145T	TENV	\$1,740	\$1,995	2.4	10	A, B	\$2,038		\$2,800
	1200	184T	TENV	\$2,284	\$2,530	2.9	15	A, B		\$2,750	\$2,800
2	1800	145T	TENV	\$1,821	\$2,076	3.0	10	A, B	\$2,038		\$2,800
	1200	184T	TENV	\$2,759	\$3,005	3.0	15	A, B		\$2,750	\$2,800
3	1800	182T	TENV	\$2,368	\$2,614	4.1	15	A, B		\$2,750	\$2,800
	1200	213T	TENV	\$3,791	\$4,523	4.7	25	A, B		\$2,750	\$2,800
5	1800	184T	TENV	\$2,883	\$3,594	6.5	25	A, B		\$2,750	\$2,800
	1200	215T	TENV	\$4,962	\$5,875	7.2	35	A, B		\$2,750	\$2,800
7 1/2	1800	213T	TENV	\$3,650	\$4,564	10.5	35	A, B		\$2,750	\$2,800
	1200	254T	TENV	\$6,173	\$7,154	11.0	50	A, B		\$2,750	\$2,800
10	1800	215T	TENV	\$4,365	\$5,325	13.0	50	A, B		\$2,750	\$2,800
	1200	256T	TEFC	\$6,562	\$7,623	13.5	75	B			\$2,800
	1200	256T	TENV	\$7,198	\$8,259	13.1	75	A, B		\$2,750	\$2,800
15	1800	254T	TENV	\$5,535	\$6,596	19.5	75	A, B		\$2,750	\$2,800
	1200	284T	TEFC	\$8,790	\$9,977	21.5	105	B			\$2,800
	1200	284T	TENV	\$8,809	\$9,996	20.0	105	A, B		\$2,750	\$2,800
20	1800	256T	TENV	\$7,399	\$8,568	27.0	105	A, B		\$2,750	\$2,800
	1200	286T	TEFC	\$12,223	\$14,213	27.0	125	B			\$2,800
	1200	326T	TENV	\$15,964	\$18,026	29.5	125	B,C	\$2,038		\$2,800
	1200	286T	TEBC	\$19,256	\$21,246	26.2	125	D	\$2,038		
25	1800	284T	TENV	\$7,765	\$8,952	31.5	105	A, B		\$2,750	\$2,800
	1200	324T	TEFC	\$14,239	\$16,394	33.0	175	B			\$2,800
	1200	364T	TENV	\$18,206	\$20,482	34.5	175	B,C	\$2,038		\$2,800
	1200	324T	TEBC	\$21,713	\$23,869	32.5	175	D	\$2,038		
30	1800	286T	TEFC	\$11,802	\$13,792	39.0	125	B			\$2,800
	1800	326T	TENV	\$14,695	\$16,756	42.0	125	B,C	\$2,038		\$2,800
	1800	286T	TEBC	\$16,723	\$18,713	37.0	125	D	\$2,038		
	1200	326T	TEFC	\$16,253	\$18,515	39.0	230	B			\$2,800
	1200	365T	TENV	\$21,181	\$23,563	42.0	230	B,C	\$2,038		\$2,800
	1200	326T	TEBC	\$23,207	\$25,469	41.0	230	D	\$2,038		
40	1800	324T	TEFC	\$13,694	\$15,849	50.0	175	B			\$2,800
	1800	364T	TENV	\$17,376	\$19,651	48.5	175	B,C	\$2,038		\$2,800
	1800	324T	TEBC	\$19,474	\$21,629	50.0	175	D	\$2,038		
	1200	364T	TEFC	\$21,292	\$23,340	52.0	330	B			\$2,800
	1200	405T	TENV	\$28,843	\$31,231	48.5	330	B,C	\$2,038		\$2,800
	1200	364T	TEBC	\$28,607	\$30,655	49.5	330	D	\$2,038		

# Contact factory for encoder resolutions higher than 1024 ppr.

\* "IntelliBrake" internally-mounted encoder (inside brake).

# Blue Max® 2000 Vector Duty Factory Build-Up Brakemotors (non-Explosion Proof)

Multiplier Symbol E3

HP	RPM	FRAME	ENCL.	STANDARD NEMA 2 BRAKE	SEVERE NEMA 4 BRAKE	460 VOLT FLA	BRAKE TQ. (LB-FT)	REF DRWG	OPTIONAL ENCODERS#		
									SL56, M56	SL85, M85	HS20*
<b>50</b>	1800	326T	TEFC	\$15,577	\$17,839	60.5	230	B			\$2,800
	1800	365T	TENV	\$20,417	\$22,799	59.5	230	B,C	\$2,038		\$2,800
	1800	326T	TEBC	\$2,106	\$23,321	60.0	230	D	\$2,038		
	1200	365T	TEFC	\$23,678	\$25,726	62.0	330	B			\$2,800
	1200	444T	TENV	\$31,395	\$34,065	62.5	330	B,C	\$2,038		\$2,800
	1200	365T	TEBC	\$30,993	\$33,041	62.0	330	D	\$2,038		
<b>60</b>	1800	364T	TEFC	\$20,422	\$22,470	73.5	330	B			\$2,800
	1800	405T	TENV	\$25,736	\$28,124	68.0	330	B,C	\$2,038		\$2,800
	1800	364T	TEBC	\$26,155	\$28,203	74.0	330	D	\$2,038		
	1200	404T	TEFC	\$26,465	\$29,034	71.0	440	B			\$2,800
	1200	445T	TENV	\$36,218	\$39,069	73.0	440	B,C	\$2,038		\$2,800
	1200	404T	TEBC	\$34,447	\$37,016	71.0	440	D	\$2,038		
<b>75</b>	1800	365T	TEFC	\$21,579	\$23,627	90.0	330	B			\$2,800
	1800	444T	TENV	\$29,906	\$32,576	87.0	330	B,C	\$2,038		\$2,800
	1800	365T	TEBC	\$28,023	\$30,071	90.0	330	D	\$2,038		
	1200	405T	TEFC	\$34,520	\$36,979	89.0	550	B			\$2,800
	1200	445T	TENV	\$44,065	\$46,662	105	550	B,C	\$2,038		\$2,800
	1200	405T	TEBC	\$44,630	\$47,089	88.0	550	D	\$2,038		
<b>100</b>	1800	405T	TEFC	\$26,490	\$29,059	110	440	B			\$2,800
	1800	445T	TENV	\$33,855	\$36,707	110	440	B,C	\$2,038		\$2,800
	1800	405T	TEBC	\$34,426	\$36,995	115	440	D	\$2,038		
	1200	444T	TEFC	\$39,337	\$42,334	125	750	B			\$2,800
	1200	449T	TENV	\$58,563	\$61,558	124	750	B,C	\$2,038		\$2,800
	1200	444T	TEBC	\$48,154	\$51,149	125	750	D	\$2,038		
<b>125</b>	1800	444T	TEFC	\$37,235	\$39,976	143	550	B			\$2,800
	1800	445T	TENV	\$44,001	\$46,743	158	550	B,C	\$2,038		\$2,800
	1800	444T	TEBC	\$45,777	\$48,519	143	550	D	\$2,038		
	1200	445T	TEFC	\$44,007	\$47,002	154	1000	B			\$2,800
	1200	449T	TENV	\$64,228	\$67,223	154	1000	B,C	\$2,038		\$2,800
	1200	445T	TEBC	\$53,506	\$56,501	154	1000	D	\$2,038		
<b>150</b>	1800	445T	TEFC	\$40,315	\$43,310	170	750	B			\$2,800
	1800	449T	TENV	\$51,434	\$54,428	173	750	B,C	\$2,038		\$2,800
	1800	445T	TEBC	\$48,857	\$51,852	170	750	D	\$2,038		
	1200	445T	TEFC	\$48,624	\$51,619	188	1000	B			\$2,800
	1200	449T	TENV	\$67,188	\$70,183	190	1000	B,C	\$2,038		\$2,800
	1200	445T	TEBC	\$57,443	\$60,438	188	1000	D	\$2,038		
<b>200</b>	1800	445T	TEFC	\$46,199	\$49,193	230	1000	B			\$2,800
	1800	L449T	TENV	\$57,471	\$60,465	235	1000	B,C	\$2,038		\$2,800
	1800	445T	TEBC	\$54,741	\$57,736	230	1000	D	\$2,038		

FACTORY BUILD-UP MOTORS

# Contact factory for encoder resolutions higher than 1024 ppr.  
\* "IntelliBrake" internally-mounted encoder (inside brake).

# Blue Max® 2000 Vector Duty Factory Build-Up Brakemotors (Explosion Proof)

Specify Class and Group

Multiplier Symbol E3

HP	RPM	FRAME	LIST PRICE	460 VOLT FLA	BRAKE TQ. (LB-FT)	ENCODER HS20*
1	1800	143T	\$5,242	1.5	6	\$4,700
	1200	145T	\$5,267	1.7	6	\$4,700
2	1800	145T	\$6,215	2.9	10	\$4,700
	1200	184T	\$6,571	3.2	15	\$4,700
3	1800	182T	\$6,643	4.1	15	\$4,700
	1200	213T	\$7,115	4.7	25	\$4,700
5	1800	213T	\$7,376	6.5	25	\$4,700
	1200	254T	\$8,237	7.2	35	\$4,700
7 1/2	1800	254T	\$8,752	12.5	35	\$4,700
	1200	256T	\$10,472	10.2	50	\$4,700
10	1800	254T	\$9,804	13.5	50	\$4,700
	1200	284T	\$12,951	16.0	75	\$4,700
15	1800	256T	\$11,514	18.0	75	\$4,700
	1200	286T	\$16,596	21.5	105	\$7,425
20	1800	284T	\$14,559	26.8	105	\$7,425
	1200	326T	\$30,634	26.0	125	\$7,425
25	1800	286T	\$16,112	32.5	105	\$7,425
	1200	364T	\$36,921	35.0	175	\$7,425
30	1800	326T	\$31,554	40.0	125	\$7,425
	1200	365T	\$39,946	41.5	230	\$7,425
40	1800	364T	\$36,649	48.0	175	\$7,425
	1200	405T	\$45,078	48.5	230	\$7,425
50	1800	405T	\$46,164	57.0	230	\$7,425
	1200	444T	\$57,362	62.5	330	\$7,425
60	1800	405T	\$48,409	68.0	330	\$7,425
75	1800	444T	\$57,149	86.0	330	\$7,425

\* "IntelliBrake" internally-mounted encoder (inside brake).

# Blue Max® 2000 Vector Duty Factory Build-Up Wide Constant Horsepower Motors

Multiplier Symbol E3

HP	BASE RPM	MAX CHP RPM	ENCLOSURE	FRAME	BASE RPM FLA (460V)	MAX RPM FLA (460v)	LIST PRICE	FOOT NOTES
<b>5</b>	500	2000	TENV	256T	13.5	6.6	\$3,758	
<b>7.5</b>	500	2000	TENV	284T	19.2	9.5	\$4,846	
<b>10</b>	500	2000	TENV	326T	24.0	13.0	\$7,525	
<b>15</b>	850	2750	TENV	364T	28.0	18.5	\$8,817	
	650	2600	TENV	365T	34.5	19.5	\$11,228	
	500	2000	TENV	365T	41.5	19.5	\$12,351	
<b>20</b>	850	2750	TENV	365T	37.5	24.5	\$11,448	
	650	2600	TENV	367T	43.5	25.5	\$12,668	
	500	2000	TENV	367T	47.5	25.5	\$16,468	
<b>25</b>	850	2750	TENV	367T	45.5	30.5	\$12,109	
	650	2600	TEBC	404T	49.5	29.5	\$13,517	
	500	2000	DPFV	364T	58.0	30.5	\$11,543	
	500	2000	TEBC	404T	54.0	29.5	\$17,245	
<b>30</b>	850	2750	DPFV	364T	54.0	36.5	\$9,498	
	850	2750	TENV	405T	51.5	35.5	\$12,404	
	650	2600	DPFV	364T	62.0	36.5	\$11,228	
	650	2600	TEBC	405T	58.0	35.0	\$16,220	
	500	2000	DPFV	365T	68.0	36.5	\$13,265	
	500	2000	DPFV	3212	86.0	38.0	\$21,000	
	500	2000	TEBC	444T	63.0	35.0	\$21,086	
<b>40</b>	850	2750	DPFV	365T	70.5	48.0	\$11,547	
	850	2750	TEBC	444T	68.5	48.0	\$19,334	
	650	2600	DPFV	365T	81.5	48.0	\$12,662	
	650	2600	DPFV	3212	94.0	46.0	\$21,750	
	650	2600	TEBC	444T	80.0	47.5	\$15,261	
	500	2000	DPFV	404T	88.5	48.0	\$28,273	
	500	2000	DPFV	3212	111	50.0	\$12,874	
	500	2000	TEBC	444T	85.0	47.5	\$24,168	
<b>50</b>	850	2750	DPFV	404T	88.0	59.5	\$15,123	
	850	2750	DPFV	3212	91.0	57.0	\$22,900	
	850	2750	TEBC	444T	84.5	59.0	\$17,924	
	650	2600	DPFV	404T	100	59.5	\$33,574	
	650	2600	DPFV	3212	114	56	\$23,750	
	650	2600	TEBC	444T	99.0	59.0	\$27,551	
	500	2000	DPFV	405T	110	59.5	\$17,924	
	500	2000	DPFV	3212	136	63	\$25,500	
	500	2000	TEBC	444T	105	59.0	\$19,844	
<b>60</b>	850	2750	DPFV	405T	105	71.0	\$35,072	
	850	2750	DPFV	3212	98.0	67.0	\$23,813	
	850	2750	TEBC	444T	100	70.0	\$27,937	
	650	2600	DPFV	405T	120	71.0	\$21,453	
	650	2600	DPFV	3212	116	68.0	\$25,750	
	650	2600	TEBC	445T	115	70.0	\$23,135	
	500	2000	DPFV	444T	127	71.0	\$43,840	
	500	2000	TEBC	445T	125	70.0	\$21,634	
<b>75</b>	850	2750	DPFV	444T	127	88.0	\$33,333	
	850	2750	DPFV	3212	125	85.0	\$24,725	
	850	2750	TEBC	445T	125	87.0	\$27,937	
	650	2600	DPFV	445T	145	88.0	\$21,453	
	650	2600	TEBC	445T	144	87.0	\$36,534	
	500	2000	DPFV	445T	155	88.0	\$23,135	
	500	2000	TEBC	445T	155	87.0	\$43,840	

FACTORY BUILD-UP MOTORS

# Blue Max® 2000 Vector Duty Factory Build-Up Wide Constant Horsepower Motors

Multiplier Symbol E3

HP	BASE RPM	MAX CHP RPM	ENCLOSURE	FRAME	BASE RPM FLA (460V)	MAX RPM FLA (460v)	LIST PRICE	FOOT NOTES
<b>100</b>	850	2750	DPFV	445T	165	115	\$21,634	
	850	2750	TEBC	449T	165	115	\$33,333	
	650	2600	DPFV	447T	195	115	\$26,827	
	650	2600	TEBC	449T	186	115	\$38,332	
	500	2000	DPFV	447T	210	115	\$29,598	
	500	2000	TEBC	449T	202	115	\$45,152	
<b>125</b>	850	2750	DPFV	447T	210	145	\$22,672	
	850	2750	TEBC	449T	205	142	\$36,641	
	650	2600	DPFV	447T	240	145	\$30,761	
	650	2600	TEBC	449T	232	142	\$43,416	
	500	2000	DPFV	449T	255	145	\$36,300	
	500	2000	TEBC	5011L	255	142	\$72,702	
<b>150</b>	850	2750	DPFV	447T	250	172	\$29,183	
	850	2750	TEBC	449T	245	172	\$39,840	
	650	2600	DPFV	449T	285	172	\$35,336	
	650	2600	TEBC	5011L	285	172	\$67,109	
	500	2000	DPFV	449T	310	172	\$42,935	
	500	2000	TEBC	5011L	305	172	\$77,677	
<b>200</b>	850	2750	DPFV	449T	330	230	\$31,036	
	850	2750	TEBC	5011L	330	227	\$68,426	
	650	2600	DPFV	449T	380	230	\$42,935	92
	650	2600	TEBC	5011L	380	227	\$79,668	
	500	2000	DPFV	508U	415	230	\$52,057	
	500	2000	DPFV	6805	435	245	\$59,990	
	500	2000	TEBC	5011L	405	227	\$84,693	
<b>250</b>	850	2750	DPFV	449T	410	290	\$33,209	92
	850	2750	TEBC	5011L	405	282	\$76,154	
	650	2600	DPFV	508U	475	290	\$51,016	92
	650	2600	DPFV	6805	500	310	\$58,550	
	650	2600	TEBC	5011L	470	282	\$81,436	
	500	2000	DPFV	508U	515	290	\$59,866	92
	500	2000	DPFV	6805	550	310	\$61,250	
	500	2000	TEBC	5011L	540	282	\$125,561	
<b>300</b>	850	2750	DPFV	508U	490	350	\$50,496	92
	850	2750	TEBC	5011L	485	345	\$91,385	
	650	2600	DPFV	6805	590	350	\$63,050	
	650	2600	TEBC	5013L	585	345	\$115,903	92
	500	2000	DPFV	6805	625	350	\$89,990	
	500	2000	TEBC	5013L	620	345	\$150,675	92
<b>350</b>	850	2250	DPFV	6805	570	410	\$61,025	
	850	2750	TEBC	5013L	535	425	\$102,330	
	650	2250	DPFV	6805	675	410	\$75,350	
	650	2600	TEBC	5013L	668	402	\$135,221	92
	500	2000	DPFV	6805	785	425	\$97,500	
<b>400</b>	850	2250	DPFV	6805	550	450	\$83,440	
	650	2250	DPFV	6805	850	460	\$95,400	
<b>450</b>	850	2250	DPFV	6805	625	500	\$98,200	
	650	2250	DPFV	6805	995	525	\$102,450	

**Footnotes:**

92 100% overload capability at maximum constant HP RPM

FACTORY BUILD-UP MOTORS

# Blue Max® 2000 Vector Duty Factory Build Options (AC Motors)

Multiplier Symbol for base motor applies to all options.

Add all applicable modifications to 56 Frame blower motors on modified TEBC motors.

Contact factory for option pricing for 3212 and 6805 frame.

**FACTORY BUILD-UP OPTIONS**

DESCRIPTION	NOTES	LIST PRICE											
		56	143-145	182-184	213-215	254-256	284-286	324-326	364-365	404-405	444-445	447-510	5000
Altitude (to 6000 ft)	1	\$55	\$55	\$77	\$93	\$122	\$203	\$266	\$342	\$494	\$701	\$1,518	\$1,518
Ambient (to 50 deg C)	1	\$55	\$55	\$77	\$93	\$122	\$203	\$266	\$342	\$494	\$701	\$1,518	\$1,518
Assembly (F3, Top Mount conduit box)	1,2,4			\$868	\$868	\$868	\$868	\$868	\$1,303	\$1,303	\$1,737	\$1,737	\$1,737
Balance, precision		\$185	\$185	\$185	\$185	\$213	\$213	\$242	\$242	\$305	\$305	\$585	\$1,375
Bearings:													
Insulated (per bearing, N/A in XP)			\$275	\$275	\$770	\$975	\$1,300	\$1,300	\$1,450	\$1,450	\$1,575	\$2,900	\$3,200
Locked (shaft up mtg.)		\$217	\$217	\$217	\$217	\$289	\$289	\$362	\$362	\$434	\$434	\$434	N/A
Roller on drive end							\$434	\$456	\$456	\$544			
Blowers: Axial (in line)	3				\$1,141	\$1,245	\$1,466	\$1,725	\$2,209	\$2,598	\$2,753	\$3,618	\$3,618
Radial (top mount)	3						\$5,428	\$5,881	\$6,332	\$6,785	\$7,237	\$7,237	\$7,237
Brakes/provisions		See Brake Selection, Specifications and Pricing section											
Conduit box: Gasketed			\$55	\$55	\$55	\$55	\$55	\$55	\$55	\$55	\$55	\$55	STD
Auxiliary (condulet)			\$421	\$421	\$421	\$421	\$421	\$421	\$421	\$421	\$421	\$421	\$421
Cast iron	2		\$43	\$43	\$43	\$43	\$43	\$43	STD	STD	STD	STD	STD
Extra inlet	2		\$42	\$42	\$42	\$42	\$42	\$42	\$42	\$42	\$42	\$42	\$42
Oversized	2		\$87	\$87	\$87	\$87	\$87	\$87	\$159	\$159	\$434	\$434	\$434
Top mount (F3)	1,2			\$868	\$868	\$868	\$868	\$868	\$1,303	\$1,303	\$1,737	\$1,737	\$1,737
Drain & Breather: Brass (ea end)			\$166	\$166	\$166	\$166	\$166	\$166	\$166	\$166	\$166	\$166	STD DE
Stainless steel (ea end)			\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$181
Expl proof (ea end)			\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$181	\$181	N/A
Documentation (Submittal data/outline)		See General Information Section											
Ductile Iron (MINIMUM QUANTITIES APPLY)				\$650	\$780	\$910	\$1,170	\$1,430	\$1,690	\$1,820	\$2,080		
Encoders/provisions		See Encoder Selection, Specification and Pricing section											
End Brackets - C-Face footed		\$97	\$97	\$143	\$143	\$194	\$308	\$443	\$641	\$957	\$1,049	\$1,104	\$1,447
End Brackets - C-Face footless		\$97	\$194	\$287	\$287	\$388	\$617	\$886	\$1,282	\$1,913	\$2,099	\$2,209	\$2,895
End Brackets - D-Flange footed			\$97	\$143	\$143	\$194	\$308	\$443	\$641	\$957	\$1,049	\$1,104	\$1,447
End Brackets - D-Flange footless			\$194	\$287	\$287	\$388	\$617	\$886	\$1,282	\$1,913	\$2,099	\$2,209	\$2,895
End Brackets - P Base (Vertical Solid Shaft)			\$350	\$350	\$489	\$617	\$921	\$1,216	\$2,052	\$2,863	\$3,853	\$3,853	\$5,066
Explosion Proof - CI I Group C (adder over D)		Add 5% to motor list price for Group C											
Export Packaging		Add 7.5% of total motor NET (Minimum \$450 NET) Charges are for crating only, Overseas documentation / fees is extra.											
Frequency (other than 60 Hz)		Add 15% to base motor list price or base list for nearest equivalent horsepower rating, based on frame size											
Grease fittings (pressure relief)		\$22	\$22	\$22	\$22	\$22	\$22	\$22	\$22	\$22	\$22	\$22	\$43
Grease - High Temperature		\$507	\$507	\$724	\$724	\$724	\$724	\$724	\$1,086	\$1,086	\$1,086	\$1,086	\$1,086
Ground lug: Conduit box		\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	\$14	STD
Frame foot	2		\$94	\$94	\$94	\$94	\$94	\$94	\$94	\$94	\$94	\$94	STD
Ground brush (drive end)		\$90	\$90	\$90	\$90	\$90	\$90	\$90	\$90	\$90	STD	STD	STD
Ground brush (non-drive end)		\$195	\$195	\$195	\$195	\$195	\$195	\$195	\$195	\$195	\$195	\$195	\$195
Grounding ring - "SGR" (ea end)		\$92	\$92	\$116	\$140	\$187	\$234	\$282	\$329	\$519	\$898	\$898	\$1,300
Hardware (stainless steel)	2		\$217	\$217	\$217	\$217	\$217	\$405	\$405	\$405	\$405	\$405	\$1,303
IEEE 841 Mechanical Features (TENV/TEFC)	2		\$709	\$873	\$1,473	\$1,523	\$1,554	\$1,640	\$1,999	\$2,403	\$2,974	\$3,572	\$4,600
Insulation: MAX GUARD		\$43	\$43	\$58	\$72	\$87	\$152	\$203	\$246	\$246	\$246	\$724	\$724
Class H (adder over CI F)		\$153	\$153	\$153	\$185	\$243	\$405	\$533	\$683	\$987	\$1,401	STD	STD
Multiple Dips and Bakes		\$29	\$29	\$38	\$59	\$75	\$126	\$161	\$198	\$266	\$346	\$452	STD
Tropicalization (fungus proof)		\$42	\$42	\$51	\$93	\$110	\$194	\$258	\$330	\$431	\$562	\$727	\$727
Vacuum Pressure Impregnation									\$1,352	\$1,563	\$1,860	\$2,113	\$2,895
IP54 Enclosure			\$106	\$152	\$168	\$185	\$198	\$250	\$272	\$476	\$646	\$646	\$750
IP55 Enclosure			\$227	\$289	\$470	\$492	\$509	\$667	\$787	\$1,214	\$1,540	\$1,540	\$1,845
IP56 Enclosure			\$473	\$637	\$1,238	\$1,259	\$1,291	\$1,348	\$1,757	\$2,097	\$2,669	\$2,987	\$3,225
Lead lugs (terminal lugs)		\$51	\$51	\$51	\$51	\$51	\$51	\$51	STD	STD	STD	STD	STD
Lead length - per ft over 6" (Multiple by no. leads)		\$3	\$3	\$4	\$4	\$4	\$4	\$4	\$7	\$7	\$9	\$14	\$14
Marine Duty: Above Deck		REFER TO FACTORY											
Below Deck		REFER TO FACTORY											
Nameplates: Auxiliary		\$51	\$51	\$51	\$51	\$51	\$51	\$51	\$51	\$51	\$51	\$51	\$51
Special stamping		\$22	\$22	\$22	\$22	\$22	\$22	\$22	\$22	\$22	\$22	\$22	\$22
Paint - special color or finish		REFER TO FACTORY											
Resistance Temperature Detectors		See Thermal Protection											
Seals: Forsheda (each end)			\$87	\$87	\$123	\$123	\$123	\$166	\$166	\$210	\$232	\$232	
Inpro/Seal VBX bearing isolator (each end)	2		\$333	\$434	\$507	\$507	\$507	\$507	\$651	\$651	\$796	\$955	\$1,158
Inpro "Smart Ring" (each end)					\$123	\$123	\$166	\$166	\$210	\$232	\$232	STD	STD
"MGS" Motor Grounding Seal (each end)	2		\$1,165	\$1,178	\$1,195	\$1,243	\$1,277	\$1,277	\$1,369	\$1,604	\$1,722	\$1,820	\$2,483
Service Factor (1.15 on VFD)	1	\$55	\$55	\$77	\$93	\$122	\$203	\$266	\$342	\$494	\$701	\$1,518	N/A
		(Add 15% to base motor list or use base price for nearest equivalent horsepower rating, based on frame size)											
Severe Duty: Standard	2		\$106	\$152	\$168	\$185	\$198	\$250	\$272	\$476	\$646	\$646	
Premium	2		\$140	\$203	\$224	\$275	\$318	\$334	\$454	\$795	\$1,077	\$1,077	STD

**Footnotes:**

- 1 Consult factory (modification may require larger frame size)
- 2 Available on cast iron motors only
- 3 Add to TEFC price
- 4 Available on 182-215T TENV only; TENV, TEFC or TEBC for other frame sizes
- 5 Must add for auxiliary conduit box or condulet

# Blue Max® 2000 Vector Duty Factory Build Options (AC Motors)

FACTORY BUILD-UP OPTIONS

Multiplier Symbol for base motor applies to all options.  
Add all applicable modifications to 56 Frame blower motors on modified TEBC motors.  
Contact factory for option pricing for 3212 and 6805 frame.

DESCRIPTION	NOTES	LIST PRICE											
		56	143-145	182-184	213-215	254-256	284-286	324-326	364-365	404-405	444-445	447-510	5000
Shafts: Basic Adder (Qty 1)		\$423	\$423	\$423	\$507	\$544	\$615	\$666	\$784	\$919	\$1,058	\$1,058	\$1,447
Basic Adder (Qty 2-4)		\$148	\$148	\$148	\$194	\$211	\$245	\$278	\$313	\$373	\$447	\$447	\$724
Basic Adder (Qty 5-up)		\$51	\$51	\$51	\$72	\$84	\$119	\$148	\$181	\$219	\$269	\$269	\$362
Drilled & Tapped hole (each)		\$14	\$14	\$14	\$17	\$20	\$25	\$32	\$35	\$39	\$46	\$46	\$72
Length up to 10" longer		\$9	\$9	\$9	\$14	\$16	\$20	\$26	\$28	\$32	\$38	\$38	Call
Other special features	1	\$43	\$43	\$43	\$65	\$65	\$80	\$101	\$109	\$123	\$145	\$152	\$289
Special material	1	\$106	\$106	\$106	\$236	\$333	\$498	\$906	\$1,159	\$1,686	\$1,821	\$1,913	Call
NEMA Standard Double		\$22	\$22	\$26	\$42	\$51	\$75	\$119	\$161	\$190	\$232	\$232	Call
NEMA Double Equal		\$22	\$22	\$26	\$42	\$51	\$75	\$119	\$161	\$190	\$232	\$232	Call
NEMA Short Shaft ("TS")							\$0	\$0	\$0	\$0	\$0	\$0	\$0
Tapered (NEMA "TR" extension)	1		\$58	\$72	\$87	\$101	\$130	\$145	\$159	\$188	\$203	\$203	Call
Threaded diameter	1	\$14	\$14	\$14	\$17	\$20	\$25	\$32	\$32	\$39	\$46	\$46	\$72
Shaft Grounding Brush - "SGB" (drive end)		\$90	\$90	\$90	\$90	\$90	\$90	\$90	\$90	\$90	STD	STD	STD
Shaft Grounding Brush - "SGB" (non-drive end)		\$195	\$195	\$195	\$195	\$195	\$195	\$195	\$195	\$195	\$195	\$195	\$195
Shaft Grounding Ring - "SGR" (ea end)		\$75	\$75	\$95	\$115	\$155	\$195	\$235	\$275	\$435	\$915	\$915	\$1,400
Shaft Grounding Ring with Inpro/Seal ("MGS")			\$408	\$529	\$622	\$662	\$702	\$742	\$926	\$1,086	\$1,711	\$1,870	\$2,558
Space Heater: Non Explosion Proof		\$211	\$211	\$211	\$211	\$211	\$316	\$316	\$379	\$463	\$549	\$619	\$905
Explosion Proof			\$423	\$423	\$423	\$423	\$633	\$633	\$633	\$928	\$1,096	\$1,239	N/A
Terminal Block - Power Leads			\$289	\$289	\$289	\$347	\$521	\$941	\$941	\$941	\$1,086	\$1,238	\$1,447
Terminal Strip - Aux. Leads	5		\$175	\$175	\$175	\$175	\$175	\$175	\$175	\$175	\$175	\$175	\$175
Terminal lugs (lead lugs)		\$51	\$51	\$51	\$51	\$51	\$51	\$51	STD	STD	STD	STD	STD
Testing: Calibration		\$1,245	\$1,245	\$1,245	\$1,245	\$1,245	\$1,245	\$1,492	\$1,701	\$1,945	\$2,420	\$3,167	\$3,618
Certified Complete		\$1,245	\$1,245	\$1,245	\$1,245	\$1,245	\$1,245	\$1,922	\$2,489	\$2,940	\$4,071	\$6,079	\$6,079
Certified Short Commercial		\$226	\$226	\$226	\$226	\$226	\$226	\$226	\$226	\$226	\$226	\$226	\$226
Duplicate Complete		\$339	\$339	\$339	\$339	\$339	\$339	\$339	\$339	\$339	\$339	\$339	\$339
Duplicate Short Commercial		\$226	\$226	\$226	\$226	\$226	\$226	\$226	\$226	\$226	\$226	\$226	\$226
Polarization index		\$1,358	\$1,358	\$1,358	\$1,358	\$1,358	\$1,358	\$2,262	\$2,262	\$2,262	\$2,262	\$2,262	\$2,316
Sound		\$1,358	\$1,358	\$1,358	\$1,358	\$1,358	\$1,358	\$2,262	\$2,262	\$2,262	\$2,262	\$2,262	\$2,316
Vibration		\$679	\$679	\$679	\$679	\$679	\$679	\$679	\$679	\$679	\$679	\$679	\$1,019
Witnessed Complete		\$1,900	\$1,900	\$1,900	\$1,900	\$1,900	\$1,900	\$2,940	\$3,731	\$4,410	\$6,106	\$12,552	\$12,552
Witnessed Sound		\$2,035	\$2,035	\$2,035	\$2,035	\$2,035	\$2,035	\$2,035	\$3,393	\$3,393	\$3,393	\$3,393	\$3,474
Witnessed Short Commercial		\$1,243	\$1,243	\$1,243	\$1,243	\$1,243	\$1,243	\$1,492	\$1,696	\$1,945	\$2,420	\$3,167	\$3,167
Witnessed Vibration		\$1,243	\$1,243	\$1,243	\$1,243	\$1,243	\$1,243	\$1,492	\$1,696	\$1,945	\$2,420	\$3,167	\$3,167
Thermal Protection - Bearing RTDs (pair)													
10 ohm Copper						\$1,334	\$1,334	\$1,334	\$1,334	\$1,334	\$1,334	\$1,334	\$4,342
120 ohm Nickel						\$1,334	\$1,334	\$1,334	\$1,334	\$1,334	\$1,334	\$1,334	\$4,342
100 ohm Platinum						\$2,652	\$2,652	\$2,652	\$2,652	\$2,652	\$2,652	\$2,652	\$4,342
Thermal Protection - Stator RTD													
10 ohm Copper						\$1,717	\$1,717	\$1,717	\$1,717	\$1,717	\$1,717	\$1,717	\$2,070
120 ohm Nickel						\$1,717	\$1,717	\$1,717	\$1,717	\$1,717	\$1,717	\$1,717	\$2,258
100 ohm Platinum						\$3,419	\$3,419	\$3,419	\$3,419	\$3,419	\$3,419	\$3,419	\$3,419
Thermal Protection - Class H Thermostats	1	\$101	\$101	\$101	\$119	\$119	\$129	\$158	\$158	\$210	\$210	\$232	\$232
Thermal Protection - Thermistors (set of 3)				\$206	\$206	\$206	\$206	\$206	\$206	\$206	\$206	\$206	\$427
Thermistor control module (separate)				\$663	\$663	\$663	\$663	\$663	\$663	\$663	\$663	\$663	
Thermistors - Siemens KTY - 84(Linear)				\$470	\$470	\$470	\$470	\$470	\$470	\$470	\$470	\$470	
Thermal Protection - Thermocouples		\$1,737	\$1,737	\$1,737	\$1,737	\$1,737	\$1,737	\$1,737	\$1,737	\$1,737	\$1,737	\$1,737	\$4,342
Vibration Detector				\$1,447	\$1,447	\$1,447	\$1,447	\$1,447	\$1,447	\$1,447	\$1,447	\$1,447	\$1,592
Voltage - Non standard		\$38	\$38	\$38	\$84	\$116	\$139	\$166	\$246	\$385	\$640	\$673	\$673

**Footnotes:**

- 1 Consult factory (modification may require larger frame size)
- 2 Available on cast iron motors only
- 3 Add to TEFC price
- 4 Available on 182-215T TENV only; TENV, TEFC or TEBC for other frame sizes
- 5 Must add for auxiliary conduit box or conduit



# Factory Modifications and Options (Build-Up)

## Altitude

Motors in this catalog are rated based on an altitude of up to 3300 ft above sea level. At higher altitudes, the air becomes more rarified (*less oxygen*), and heat is not transferred as efficiently. As such, additional insulation or other active materials may be required to provide proper cooling. Other design options include reducing the HP or service factor rating or specifying high efficiency designs, which typically run cooler.

## Ambient

Motors in this catalog are rated at an ambient (*surrounding*) temperature of 40°C (104°F). Higher temperatures cause faster degradation of the motor insulation system, resulting in shorter motor life. Most Blue Max® and Black Max® motors are designed for operation on inverter power at their Class F insulation limit at full load (1.0 service factor). In most cases, a higher ambient temperature specification will require the next larger frame size; in some, added material within the same frame size is adequate. High ambient requirements should be referred to the factory.

## Assembly

Normal assembly position is F1 (*conduit box on left side when viewed from the drive end*). F2 assembly, in which the conduit box is on the right side when viewed from drive end, is available as a no charge factory option—please specify at time of order. Make the appropriate adder for F2 assembly for MOD Center orders. F3 assembly, in which the conduit box is top-mounted, is available on 182-5013 frame totally enclosed cast iron motors. In most F3 assemblies, the conduit box will not be centered, as viewed along the length of the motor.

## Balance

All Marathon Electric motors are dynamically balanced to achieve vibration levels below NEMA standards. Precision balance is available.

RPM Range	Standard Balance	Precision Balance
3000-3600	.15 in/sec	.08 in/sec
1500-2900	.15 in/sec	.08 in/sec
1000-1499	.15 in/sec	.08 in/sec
999 & slower	.12 in/sec	.08 in/sec

## Bearings

Motors in this catalog utilize double shielded ball bearings, except rolled steel 56-145 frame which use double sealed ball bearings, and 284TS frame and larger (2-Pole) which use single shielded ball bearings. Larger horsepower motors (445 frame and larger) for belted applications require the use of roller bearings...this option is available as a no-charge factory option. Other bearing options include: RTDs (*see Thermal Protection*), locked bearings for shaft up mounting (*available at the list adders shown*), thrust bearings (*contact factory*), bearing isolators (*a.k.a. Inpro/Seal®...see Seals*), heat stabilized bearings for high ambient conditions (*contact factory*), and insulated bearings.

## Blowers

Low rotational speeds, common in many vector applications, cause additional heat within the motor. As a result, these motors are designed as TENV or TEBC. Marathon Electric offers two types of blower units, depending upon the application requirements. Most TEBC requirements are satisfied with Marathon's axial blower, in which the blower motor and fan are in the same (*horizontal*) plane as the motor drive shaft. While these blowers accept the addition of an encoder, TEBC brakemotors require a radial blower, in which air is force ventilated from the top (*or side*) into a chamber on the non-drive end of the motor and air is forced over the frame. The addition of axial blower kits to standard motors should be referred to the factory for approval, and the ability of the final design to accept an encoder. See blower motor data.

## Brakes and Brake Provisions

Spring-set, electrically released mechanical disc brakes are available for stopping and/or holding the load. For most applications, brake manufacturers recommend a torque rating equal to 140% of the motor full load torque. In many cases, a 50% or 100% rated brake can be utilized; however, the final customer should provide this information. Brakes are available in NEMA 2, NEMA 4 or NEMA 4X constructions, depending upon the application requirements. Marathon Electric Severe Duty Brakemotors include a cast iron NEMA 4 brake, except 6-10 lb-ft (steel). Brakemotor provisions include a suitable C-Face bracket and shaft extension to accommodate the (*future*) addition of a brake. Standard brakemotors include brakes suitable for horizontal mounting only. See Brake pricing for Vertical-Above and Vertical-Below adders and modifications, such as space heaters.

## Conduit box

Standard conduit box construction is based on the individual product description, i.e. severe duty motors always have cast iron conduit boxes, while some standard duty motors come with stamped steel and others cast iron. Additional gaskets, extra inlets, auxiliary box (*or conduit, which is an add-on conduit entry connected to the main conduit box*), and larger sizes are available per the adders shown.

## Connections

While the inverter provides soft starting, variable torque applications could require by-pass operation. In these cases, it may be desirable to have the motor connected to allow for other traditional soft-starting options, including wye-start/delta-run or part winding start. Refer to the product features to determine whether the motor is suitable for by-pass operation, before assuming this capability.

Continued on next page.

# Factory Modifications and Options (Build-Up)

## Drains & Breathers

Standard Duty motors include a weep hole as standard, while Severe Duty and Explosion Proof motors include a brass drain/breather as standard. These are located in the drive end bracket at the lowest point. A drain/breather is available on Standard Duty, or stainless steel for Severe Duty, or a Crouse Hinds ECD for Explosion Proof motors, per the adders shown.

## Encoders

These electronic devices sense rotor speed and direction. A cable is connected from the encoder to the VFD. Various mechanical provisions on the motor are required to attach the encoder; these may include C face on the non drive end of the motor and special shaft extension. Various resolutions (*pulses per revolution*) are available. All encoders offered are quadrature (*direction sensing*), with line driver output. See Encoder pricing and Data section.

## Export Packaging

Special packaging for shipment on a sea-going vessel is available by adding 6% to the base list of the motor. Export documentation and certificates not included in pricing, contact factory.

## Frequency

All motors in this catalog are rated at a base operating frequency of 60 Hz. Other base frequencies are available by adding 15% to the base list of the motor. Consult factory on special frequency applications, as these occasionally require oversizing the motor to the next larger frame size. Your application specialist may choose to price the special frequency motor based on the list price of a higher horsepower rating in the selected frame size (*instead of the 15% adder shown*).

## Grease Fitting & Special Grease

Devices for installing grease into the motors, such as zerk fittings, are available per the list adders shown. Severe Duty motors come with zerk fittings as standard equipment. For special greases in high or low ambient conditions, contact factory for recommendations and availability.

## Ground Lug

All Marathon motors come with crimp-type grounding provisions in the conduit box; clamp-type grounding provisions in the conduit box are available at the list price shown. Ground lug on frame foot is available on all cast iron frame, non-explosion proof designs.

## Ground Brush

Shaft grounding brushes are recommended, as stated in NEMA MG1-31.4.4.3, to protect a motor from inverter-sourced shaft voltages, either both bearings must be insulated or the motor shaft must be effectively grounded. One brush is adequate to bleed down inverter-sourced shaft voltages, thereby protecting both bearings for motors as large as 5011 frame. **At this time, UL policy prevents the use of ground brushes or insulated bearings in Division 1 or Division 2 installations.**

A shaft ground brush comes standard on Marathon Electric's Blue Max 444 frame and larger. Shaft ground brushes are available through Marathon's Mod Central or as a Factory Build-up option per the list adders shown.

## Hardware

Standard fasteners are corrosion resistant grade 5. Stainless steel hardware is available at the list adders shown.

## IP Enclosures

XRI® Severe Duty are rated for an IP54 enclosure, XRI®-841 (IEEE841) are rated for an IP56 enclosure, and the IEC Globetrotter® motors are rated an IP55 enclosure. The indicated adders are for upgrading Marathon's Blue Max® motors to the indicated IP enclosure needed.

## Insulation

All Blue Max® and Black Max® motors come with the exclusive MAX GUARD® Insulation System. MAX GUARD® is available on a production basis on other motors. A Class H system, with higher temperature components, is available as shown. Additional dips and bakes are available, but should be referred to the factory on a case-by-case basis. Other special processes include vacuum pressure impregnation (*VPI*) and tropicalization (*a.k.a. fungus proofing*). Note that VPI is available only on 360 frame and larger.

## Leads

Standard lead length is 6 inches on 56-449 frame and 14 inches on 5000 frames. Additional lead length is available as shown. For lead lengths over 6 feet, consult factory for availability. Terminal lugs are standard on 360-5000 frame motors and are available on smaller motors as shown.

Continued on next page.

# Factory Modifications and Options (Build-Up)

## Marine Duty

Marathon Electric's XRI Severe Duty and XRI-841 (IEEE841) and Blue Chip Severe Duty Explosion Proof motors meet USCG, IEEE45 Marine Duty specifications. For offshore platforms, the XRI-841 (IEEE841) motors meet API RP14F and are rated for an IP56 enclosure. The IEC (Metric) Globetrotter® motors are also designed for Marine Duty applications and meet IEEE45, USCG, and IEC60092.

For other Marine Duty information such as ABS Certification, above and below deck applications, consult Marathon Electric directly.

## Nameplates & Auxiliary Nameplates

Nameplate data is provided per NEMA requirements. Special stamping to include additional data is available as shown. Additional (*auxiliary*) nameplates, showing additional information, are available per the list adder shown.

## Shafts Seals

**Blue Max®** motors are equipped with neoprene shaft slingers to restrict entrance of debris into the gap between the shaft and bracket at the shaft exit. Shaft seals (i.e. Forsheda®) provide additional protection from the ingress of liquids and small (*non abrasive*) dust. Bearing isolators (i.e. Inpro/Seal® or Garlock®) provide superior protection from the ingress of liquids and abrasive dust. The indicated adders are applied for the drive end of the motor (*consult factory for availability of shaft seals on the non-drive end of motors equipped with accessories*).

## Service Factor

Standard service factor for **Blue Max®** and **Black Max®** motors is 1.0 on inverter power. 1.15 service factor on inverter power is available at the list adders shown. Consult factory for resultant frame size. 1.15 SF on VFD power assumes Class B temperature rise at full load.

## Severe Duty Construction

Marathon Electric offers two levels of "Severe Duty" construction. "Standard Severe Duty" includes all cast iron construction, threaded conduit box and epoxy exterior paint. "Premium Severe Duty" adds epoxy interior coating on rotor O.D. and stator bore, lead separator, conduit box gaskets, extended grease tubes, grease fittings, bearing caps (*254T-up*), precision balance and actual test data shipped with each motor.

## Special Shafts

For pricing special shafts, add the basic adder for the required quantity (*each model*) to the required feature. For options not shown, and where indicated via footnote, consult factory.

## Space Heaters

Used to prevent the build up of condensation on the windings of the motor, when the motor is not operating. Space heaters are typically installed on the end-turns of the coils, and are powered by single phase 115 or 230 volt. Leads are terminated in main conduit box.

### Space Heater Wattage

Frame Size	Watts
52-256	27
284-326	42
364-405	126
444-5013	144

## Terminal Blocks

Terminal blocks are available for the connection of power leads in the conduit box on 182-510 frame motors. Auxiliary leads for connection of spaceheaters and thermostats can be made to a terminal block in an auxiliary conduit box or conduit box on 444-5000 frame motors. Consult Marathon Electric directly for 324-405 frames and auxiliary terminal block connections. See Auxiliary Conduit box for the list adder for this item.

## Terminal (Lead) Lugs

Terminal lugs are standard on 360-5000 frame motors. For other frame sizes, make the appropriate adder.

## Testing

All motors are tested prior to shipment to ensure proper operation. Test results for XRI® motors are shipped with each. Other tests are available at the LIST PRICES shown. For a complete description of tests, consult factory.

## Thermal Protection (Thermostats)

All **Blue Max®** and **Black Max®** motors are equipped with Class F normally-closed thermostats (*one per phase*) for detection of overload conditions. Other devices are available as shown.

## Vibration Detector

Robert Shaw Model 366 vibration detectors are available on 180 frame and larger.

## Voltage (Special)

230, 460, 575, and 230/460 volt windings are considered standard. For other voltages, make the appropriate adder as shown.

# Factory Modifications and Options (Build-Up)

## Encoder Selection Guide

Also known as a tachometer, an encoder is a feedback device that translates mechanical motion into an electrical signal. Encoders use two basic technologies or types: magnetic/magneto-resistive, and optical, and two common mounting methods: hollow shaft and modular C-face, using one of three wiring methods: industrial connector, military connector, or direct cabling/pigtail. Encoder selection should be based on mechanical service duty, and environment:

### Type of Encoding

Optical encoders are usually less expensive, but are much more vulnerable to shock, vibration, and contamination from dusty, dirty, wet, or chemical environments; magnetic encoders are recommended for these environments.

### Encoder Mounting


Hollow shaft (tethered) encoders are easier to mount; modular C-face (bearingless) encoders are often more robust, and are recommended for rough service applications, as they have no bearings nor shaft loads, and are directly mounted to the motor frame. Other mounting technologies, such as solid shaft coupled or foot mounting, are available and may be required for special applications, but are not generally recommended. Contact a factory representative for special encoder mounting pricing.

### Encoder Wiring

Encoders may be connected via MS military connectors (solder connections with threaded housing), built-in cable (pigtail), or EPIC industrial connectors (10 pin with screw terminals). Not all connectors are available in all models; consult encoder listings.

Recommended Type	Typical Applications*								
	Conveying	Converting	Films	Food <sup>s</sup>	Paper	Steel	Hoist	Marine <sup>s</sup>	Oil Drilling <sup>e</sup>
Light									
Standard/Mil									
Heavy									
Severe									

\*Darker = better suited for application    <sup>s</sup>Stainless Option Recommended    <sup>e</sup>Explosion Protected Recommended

	Type of Encoder	Mounting	In-Stock Encoders	Special Order Encoders
 <b>Heavier Duty</b>	Optical Light Duty	Hollow Shaft	<b>Avtron HS25A</b> <b>Avtron HS35A</b> <b>BEI HS35</b> <b>Dynapar HS35</b>	BEI HS25, X25E
	Optical Mill Duty	Hollow Shaft	<b>M3</b>	
	Magnetic Mill Duty	Hollow Shaft	<b>HS35M</b>	
	Magnetic Heavy Duty	Hollow Shaft	Avtron M4, M6	Northstar HS56, HS85
	Magnetic Heavy Duty	Modular C-Face	<b>Avtron M56</b> <b>Northstar SL56</b>	Avtron M56S, M85, M285 Northstar SL85
	Magnetic Severe Duty	Hollow Shaft		Avtron M685

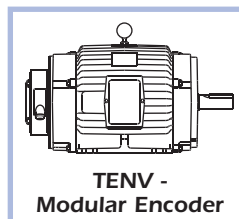
\*Marathon Electric makes no warranty as to suitability of purpose; recommendations are based on industry standard applications and are subject to warranty terms and conditions of sale.

# Factory Modifications and Options (Build-Up) Encoder Selection and Pricing

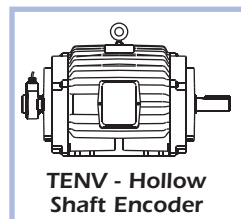
*Refer to Black Max<sup>®</sup> and Blue Max<sup>®</sup> stock motor pages for encoders available through MOD Center.  
Encoder kits are available from stock inventory. List prices shown below include provisions.  
Contact factory for applicable mounting charges for customer-supplied encoders.*

## TENV Motors

Brand (Manufacturer)	Model	Frame	Termination	Marker Pulse	Single O/P LIST	Dual O/P LIST	Provisions only	Fig.
<b>Avtron</b>	HS25A	56-286	10 pin MS connector	Standard	\$950	----	\$500	B
	HS35A	56-449	10 pin MS connector	Standard	\$1,291	----	\$679	B
		5009-5013			\$1,791		\$1,179	
	HS35M	56-449	Industrial connector	Standard	\$1,495	\$2,053	\$679	B
		5009-5013			\$1,995	\$2,553	\$1,179	
	M3	56-5013	Industrial connector	Standard	\$2,500	\$3,750	\$679	B
	M4	56-5013	Industrial connector	Standard	\$3,300	\$4,950	\$679	B
	M56 (Dbl C-face)	56-5013	Industrial connector	Standard	\$2,038	\$3,412	\$679	A
M85 (Dbl C-face)	182-286	Industrial connector	Standard	\$2,750	\$4,039	\$679	A	
M685	143-5013	Industrial connector	Standard	\$9,919	\$12,894	\$679	B	
<b>BEI</b>	HS25	56-286	10 pin MS connector	Standard	\$950	----	\$500	B
	HS35	56-449	10 pin MS connector	Standard	\$1,291	----	\$679	B
5009-5013		\$1,791			\$1,179			
<b>Dynapar (Danaher)</b>	HS20	56-286	10 pin MS connector	Standard	\$600	----	\$500	B
	HS35	56-449	10 pin MS connector	Standard	\$1,291	\$1,807	\$679	B
5009-5013		\$1,791			\$2,307	\$1,179		
<b>Encoder Products</b>	260	56-286	M12 Euro-style	Standard	\$645	----	\$500	B
	770 (Dbl C-face)	56-5013	10 pin MS connector	Standard	\$2,038	----	\$679	A
<b>Heidenhain</b>	ERN120	56-449	0.5 meter cable	Add \$272	\$1,671	----	\$679	B
<b>NorthStar (Danaher)</b>	HSD35	56-449	Industrial connector	Standard	\$1,395	\$1,953	\$679	B
		5009-5013			\$1,895	\$2,453	\$1,179	
	HS56	56-5013	Industrial connector	Standard	\$3,300	\$4,950	\$679	B
	SL56	56-5013	Industrial connector	Standard	\$2,038	\$3,412	\$679	A
	SL56 (Dbl C-face)	56-5013	Industrial connector	Standard	\$2,241	\$3,621	\$679	A
	SL85 (Dbl C-face)	182-286	Industrial connector	Standard	\$2,750	\$4,039	\$679	A
	8500	182-449	Industrial connector	Add \$272	\$6,100	\$7,495	\$1,445	A
	SL1250 (Dbl C-face)	324-405	Industrial connector	Add \$272	\$3,450	\$3,425	\$1,445	A
<b>Turck</b>	A02H	56-449	M12 Euro-style	Standard	\$1,450	----	\$679	B
		5009-5013			\$2,096	----	\$1,179	



**A**



**B**

# Factory Modifications and Options (Build-Up)

## Encoder Selection and Pricing

Refer to **Black Max<sup>®</sup>** and **Blue Max<sup>®</sup>** stock motor pages for encoders available through MOD Center. Encoder kits are available from stock inventory. List prices shown below include provisions. Contact factory for applicable mounting charges for customer-supplied encoders.

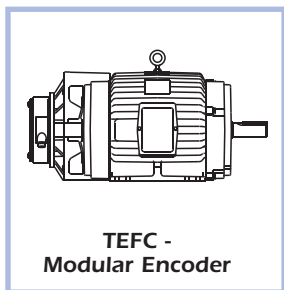
### TEFC Motors

Brand (Manufacturer)	Model	Frame	Termination	Marker Pulse	Single O/P LIST	Dual O/P LIST	Provisions only	Fig.
Avtron	HS35A	213-449	10 pin MS connector	Standard	\$1,291	----	\$679	E
		5009-5013			\$1,791	----	\$1,179	
	HS35M	213-449	Industrial connector	Standard	\$1,495	\$2,053	\$679	E
		5009-5013			\$1,995	\$2,553	\$1,179	
	M3	213-449	Industrial connector	Standard	\$2,500	\$3,750	\$679	E
	M4	213-449	Industrial connector	Standard	\$3,300	\$4,950	\$679	E
M85 (Dbl C-face)	213-5013	Industrial connector	Standard	\$3,516	\$4,804	\$1,945	D	
M685	213-5013	Industrial connector	Standard	\$9,919	\$12,894	\$1,179	E	
BEI	HS35	213-449	10 pin MS connector	Standard	\$1,291	----	\$679	E
		5009-5013			\$1,791	----	\$1,179	
Dynapar (Danaher)	HS35	213-449	10 pin MS connector	Standard	\$1,291	\$1,807	\$679	E
		5009-5013			\$1,791	\$2,307	\$1,179	
NorthStar (Danaher)	HSD35	213-449	Industrial connector	Standard	\$1,395	\$1,953	\$679	E
		5009-5013			\$1,895	\$2,453	\$1,179	
	HS56	213-5013	Industrial connector	Standard	\$3,300	\$4,950	\$679	E
	SL85 (Dbl C-face)	213-5013	Industrial connector	Standard	\$3,516	\$4,804	\$1,945	D
8500	213-5013	Industrial connector	Add \$272	\$6,100	\$7,495	\$1,945	D	
Turck	A02H	56-449	M12 Euro-style	Standard	\$1,450	----	\$679	E
		5009-5013			\$2,096	----	\$1,179	

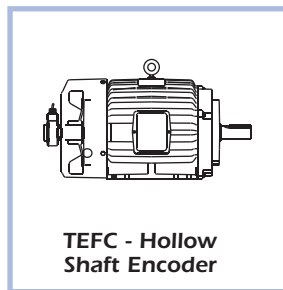
### TEBC Motors

Brand (Manufacturer)	Model	Frame	Termination	Marker Pulse	Single O/P LIST	Dual O/P LIST	Provisions only	Fig.
Avtron	HS35A	213-449	M12 Euro-style	Standard	\$1,291	----	\$679	G or H
		5009-5013			\$1,791	----	\$1,179	
	HS35M	213-449	M12 Euro-style	Standard	\$1,495	\$2,053	\$679	G or H
		5009-5013			\$1,995	\$2,553	\$1,179	
M56 (Dbl C-face)	213-5013	Conduit box	Standard	\$2,038	\$3,412	\$679	G or H	
BEI	HS35	213-449	Conduit box	Standard	\$1,291	----	\$679	G or H
		5009-5013			\$1,791	----	\$1,179	
Dynapar (Danaher)	HS35	213-449	M12 Euro-style	Standard	\$1,291	\$1,807	\$679	G or H
		5009-5013			\$1,791	\$2,307	\$1,179	
Encoder Products	770	213-449	Conduit box	Add \$272	\$2,038	----	\$679	G or H
Heidenhain	ERN120	213-449	Conduit box	Add \$272	\$1,671	----	\$679	G or H
NorthStar (Danaher)	SL56	213-5013	Conduit box	Standard	\$2,038	\$3,412	\$679	G or H
Turck	A02H	213-449	M12 Euro-style	Standard	\$1,450	----	\$679	G or H
		5009-5013			\$2,096	----	\$1,179	

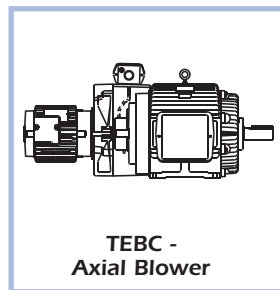
\* - Axial style blower available in 213-5013 frame. Radial style blower available in 284-5013 frame.



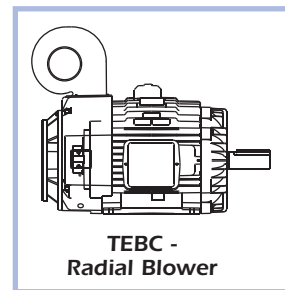
D



E



G



H

# Factory Modifications and Options (Build-Up) Encoder Selection and Pricing

*Refer to Black Max<sup>®</sup> and Blue Max<sup>®</sup> stock motor pages for encoders available through MOD Center.  
Encoder kits are available from stock inventory. List prices shown below include provisions.  
Contact factory for applicable mounting charges for customer-supplied encoders.*

## Explosion Proof Motors (Class I Groups C&D, Class II Groups F&G)

Brand (Manufacturer)	Model	Frame	Termination	Marker Pulse	Single O/P LIST	Dual O/P LIST	Provisions only	Fig.
<b>Avtron</b>	M6	143-449	Industrial connector	Standard	\$6,110	\$7,525	N/A	C
<b>BEI</b>	H38	143-449	1/2"-14 conduit	Standard	\$3,621	---	N/A	C
	H52	143-449	1/2"-14 conduit	Standard	Call	Call	N/A	
<b>Dynapar</b>	X25	143-449	1/2"-14 conduit	Standard	\$3,621	---	N/A	C

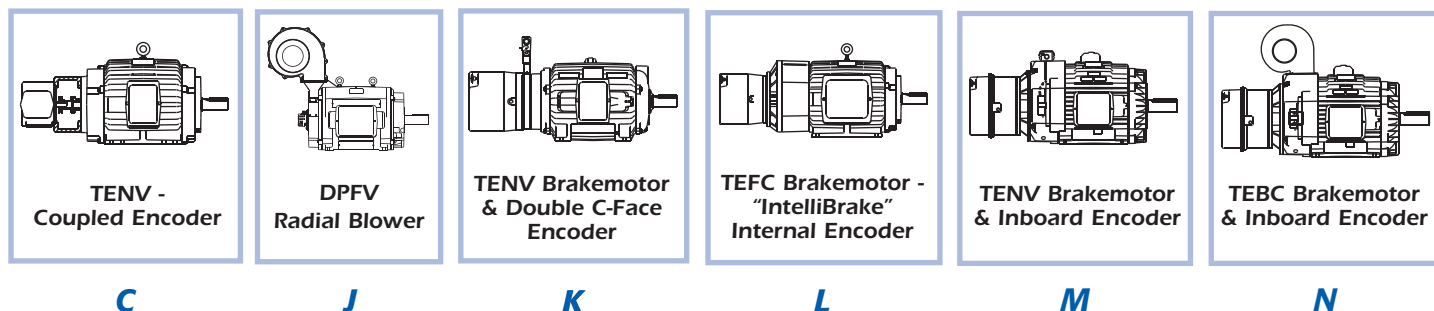
## DPFV Motors - Radial Blower

Brand (Manufacturer)	Model	Frame	Termination	Marker Pulse	Single O/P LIST	Dual O/P LIST	Provisions only	Fig.
<b>Avtron</b>	HS35A	364-449	10 pin MS connector	Standard	\$1,291	---	\$679	J
		505-6805			\$1,791	---	\$1,179	J
	HS35M	364-449	Industrial connector	Standard	\$1,495	---	\$679	J
		505-6805			\$1,995	---	\$1,179	J
	M3	364-449	Industrial connector	Standard	\$2,500	\$3,750	\$679	J
	M4	364-449	Industrial connector	Standard	\$3,300	\$4,950	\$679	J
M56 (Dbl C-face)	364-6805	Industrial connector	Standard	\$2,038	\$3,412	\$679	J	
<b>BEI</b>	HS35	364-449	10 pin MS connector	Standard	\$1,291	---	\$679	J
<b>Dynapar (Danaher)</b>	HS35	364-449	10 pin MS connector	Standard	\$1,291	\$1,807	\$679	J
		505-6805			\$1,791	\$2,307	\$1,179	J
	HSD35	364-449	Industrial connector	Standard	\$1,395	\$1,953	\$679	J
		505-6805			\$1,895	\$2,453	\$1,179	J
<b>Encoder Products</b>	770	364-6805	10 pin MS connector	Add \$272	\$2,038	---	\$679	J
<b>Heidenhain</b>	ERN120	364-449	0.5 meter cable	Add \$272	\$1,671	---	\$679	J
<b>NorthStar</b>	SL56	364-6805	Industrial connector	Standard	\$2,038	\$3,412	\$679	J

## BRAKEMOTORS (Contact Marathon Electric for resolutions above 1024 ppr)

Brand (Manufacturer)	Model	Frame	Termination	Marker Pulse	Single O/P LIST	Dual O/P LIST	Provisions only	Fig.
<b>NorthStar (Danaher)</b>	SL56 (Dbl C-Face)	143-145	Industrial connector	TENV	\$2,241	\$3,621	N/A	K
	SL85 (Dbl C-Face)	182-286	Industrial connector	TENV	\$2,750	\$4,039	N/A	K
	SL56	324-449	Industrial connector	TENV	\$2,038	\$3,412	N/A	M
	SL56	213-449	Conduit Box	TEBC	\$2,038	\$3,412	N/A	N
<b>Avtron</b>	M56 (Dbl C-Face)	143-449	Industrial connector	TENV	\$2,038	\$3,412	N/A	K or M
	M85 (Dbl C-Face)	182-286	Industrial connector	TENV	\$2,750	\$4,039	N/A	K
	M56 (Dbl C-Face)	213-449	Conduit Box	TEBC	\$2,038	\$3,412	N/A	N

For TEFC brakemotors, use the "IntelliBrake" internally-mounted Encoder option (see Brake selection, pricing and specifications section). Ref Fig. L below.



FACTORY BUILD-UP OPTIONS

# Factory Modifications and Options (Build-Up)

## Encoder Technical Data

FACTORY BUILD-UP OPTIONS

### Features and Specifications:

All encoders feature the following specifications:

- Incremental, Differential Line Driver, Quadrature format
- Marker pulse ("Z" pulse) standard
- ESD, Overvoltage, Reverse voltage (except Turck), Output short circuit protection

Characteristic	Avtron					
	HS25A	HS35A	HS35M	M3	M56 / M85	
Minimum/Maximum bore	3/8 - 3/4"	1/2 - 1-1/8"	1/2 - 1-1/8"	5/8 - 2-3/8"	1/2 - 3-3/8"	
Sensor type	Optical	Optical	Magneto-Resistive	Optical	Magneto-Resistive	
Mounting type	Hollow Shaft	Hollow Shaft	Hollow Shaft	Hollow Shaft	Modular (bearing-less)	
Resolution (ppr) available	1-8192	1-5000	1-2048	240-2500	120-2048	
Input Voltage (VDC)	5-26	5-26	5-24	5-24	5-24	
Frequency response (kHz) @ max resolution	125	125	165	150	150	
Output current capacity (typical/maximum)	40 mA	40 mA	40/3000 mA	80/1500 mA	80/1500 mA	
Current consumption (plus line driver load)	50 mA	50 mA	80 mA	80 mA	60 mA	
IP Protection Code	IP65	IP65	IP65	IP66	IP66	
Operating temperature (degrees C)	-20 to +100	-20 to +100	-20 to +85	-20 to +85	-40 to +100	
Operational humidity range	up to 98%	up to 98%	up to 98%	up to 100%	up to 100%	
Storage temperature range (degrees C)	-40 to +100	-40 to +100	-40 to +100	-40 to +120	-40 to +120	
CE mark	Yes	Yes	Yes	Yes	Yes	
UL Recognized	No	No	No	No	No	
CSA certified (alternate "CUL")	No	No	No	No	No	
Warranty term*	3 years	3 years	3 years	3 years	3 years	
Characteristic	BEI	Dynapar		NorthStar		
	HS35	HS20	HS35	SL56 / SL85 / HS56	HSD35	
Minimum/Maximum bore	1/2 - 1"	1/4 - 5/8"	1/4 - 1-1/8"	5/8 - 3-3/4" (HS56 to 1-1/8")	1/4 - 1-1/8"	
Sensor type	Optical	Optical	Optical	Magneto Resistive	Optical	
Mounting type	Hollow Shaft	Hollow Shaft	Hollow Shaft	Modular (bearing-less)	Hollow Shaft	
Resolution (ppr) available	1-10,000	1-2540	1-2500	64-2048	1-2500	
Input Voltage (VDC)	5-28	5-26	5-26	5-15 (5-24 optional)	5-26	
Frequency response (kHz) @ max resolution	300 (10000 ppr)	100	100	120	120	
Output current capacity (typical/maximum)	100 mA	40 mA	40 mA	145/400 mA	40 mA	
Current consumption (plus line driver load)	120 mA	100 mA	100 mA	40 mA	40 mA	
IP Protection Code	IP65	IP65	IP67	IP65	IP67	
Operating temperature (degrees C)	-40 to +105	-40 to +85	0 to +100	-40 to +100	-40 to +90	
Operational humidity range	up to 98%	up to 98%	up to 98%	up to 100%	up to 100%	
Storage temperature range (degrees C)	-40 to +105	-40 to +85	-40 to +90	-40 to +120	-40 to +120	
CE mark	Yes	Yes	Yes	No - EU Conformance	Yes	
UL Recognized	Yes	No	No	No	No	
CSA certified (alternate "CUL")	Yes (CUL)	No	No	No	No	
Warranty term*	3 years	3 years	3 years	3 years	3 years	
Characteristic	Turck	Encoder Products			Explosion Proof, Class I Gr C&D, Class II Gr E,F,G	
	A02H	260	770	BEI H38	Dynapar X25	
Minimum/Maximum bore	1/2 - 1-1/4"	1/4 - 5/8"	5/8 - 1"	N/A	N/A	
Sensor type	Optical	Optical	Optical	Optical	Optical	
Mounting type	Hollow Shaft	Hollow Shaft	Modular (bearing-less)	Coupled	Coupled	
Resolution (ppr) available	50-5000	1-2540	1-4096	1-72,000	1-5000	
Input Voltage (VDC)	5-30	5-16	5-28	5-28	5-26	
Frequency response (kHz) @ max resolution	300	200	200	1000 (72000 ppr)	100	
Output current capacity (typical/maximum)	40 mA	20 mA	100 mA	100 mA	40 mA	
Current consumption (plus line driver load)	100 mA	100 mA	100 mA	125 mA	80 mA	
IP Protection Code	IP65	IP50	IP50	IP66	IP56	
Operating temperature (degrees C)	-20 to +85	0 to +70	0 to +70	-40 to +80	0 to +70	
Operational humidity range	up to 98%	up to 98%	up to 98%	up to 100%	up to 98%	
Storage temperature range (degrees C)	-40 to +100	-40 to +100	-25 to +100	-40 to +90	-25 to +90	
CE mark	Yes	Yes	Yes	Yes	Yes	
UL Recognized	Yes	No	No	Yes	Yes	
CSA certified (alternate "CUL")	Yes	No	No	Yes (CUL)	Yes	
Warranty term*	3 years	3 years	3 years	3 years	3 years	

\* From date of manufacture. High temperature or high duty cycle operation will be considered in determining warranty term.



# Factory Modifications and Options (Build-Up) Encoder Technical Data

## Encoder Connections

Channel	Avtron						BEI		
	HS25A / HS35A / HS35M			M3 / M4 / M56 / M85			HS35		H38
	10 pin MS	Ind. Connector	Pigtail	10 pin MS	Ind. connector	Pigtail	10 pin MS	Pigtail	Terminal
<b>A</b>	A	2 (HS35M)	GRN	D	2	GRN	A	YEL	4
<b>B</b>	B	3 (HS35M)	BLU	E	3	BLU	B	BLU	5
<b>Z</b>	C	4 (HS35M)	ORG	C	4	ORG	C	ORG	6
<b>Power +</b>	D	6 (HS35M)	RED	B	6	RED	D	RED	3
-----	E	10 (HS35M)		F (M3 only)	10 (M3 only)		E		
<b>Common</b>	F	1 (HS35M)	BLK	A	1	BLK	F	BLK	2
<b>Case</b>	G		WHT				G	GRN	1
<b>A'</b>	H	7 (HS35M)	VIO (YEL - HS35M)	G	7	YEL	H	WHT/YEL	7
<b>B'</b>	I	8 (HS35M)	BRN (GRA - HS35M)	H	8	GRA	I	WHT/BLU	8
<b>Z'</b>	J	9 (HS35M)	YEL (WHT - HS35M)	I	9	WHT	J	WHT/ORG	9

Channel	Dynapar				NorthStar		Turck	EPC	
	HS20 / HS35			X25	SL56 / SL85 / HSD35		A02H	260	770
	10 pin MS	M12 Euro	Pigtail	Terminal	Ind. connector	Pigtail	M12 Euro	Cable	10 pin MS
<b>A</b>	A	1 BRN	BRN	TB2-A (3)	3	BLU	3 - GRN	BRN	A
<b>B</b>	B	4 ORG	ORG	TB2-B (1)	2	GRN	5 - GRY	RED	B
<b>Z</b>	C	6 YEL	YEL	TB1-Z (2)	4	VIO	7 - BLU	ORG	C
<b>Power +</b>	D	2 RED	RED	TB1+V (5)	6	RED	2 - BRN	WHT	D
-----	E		BLK/WHT		10				E
<b>Common</b>	F	7 BLK	BLK	TB1-C (4)	1	BLK	1 - WHT	BLK	F
<b>Case</b>	G		GRN	TB2-G (5)	5				G
<b>A'</b>	H	3 BRN/WHT	BRN/WHT	TB2-A' (4)	8	GRA	4 - YEL	YEL	H
<b>B'</b>	I	5 ORG/WHT	ORG/WHT	TB2-B' (2)	7	YEL	6 - PNK	GRN	I
<b>Z'</b>	J	8 YEL/WHT	YEL/WHT	TB1-Z' (1)	9	ORG	8 - RED	BLU	J

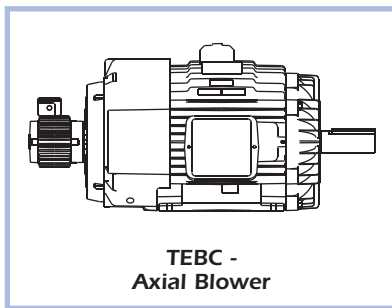
# Factory Modifications and Options (Build-Up) Blower Motor Technical Data

## Totally Enclosed, Blower Cooled

Motor Frame	Type	Fig.	HP (60/50Hz)	RPM	Frame Construction	Volts	Hz	FLA's	Sound Pressure	Watts
213T - 449T	Axial	A	1/75	1735/1460	Cast Iron S.D.	230/460-190/380	60/50	3.0 / 1.5	40	850
213T - 449T	Axial	A	1	1735	Cast Iron S.D.	575	60	1.2	40	850
5009 - 5013L	Axial	A	2/1.5	1735/1460	Cast Iron S.D.	230/460-190/380	60/50	6.0/3.0	40	1800
364T-405T	Radial	B	1/75	3450/2850	Rolled Steel	230/460-190/380	60/50	3.7/1.85	68	1000
364T-405T	Radial	B	1	3450	Rolled Steel	575	60	1.5	68	1000
444T-5013L	Radial	B	2/1.5	1735/1460	Cast Iron S.D.	230/460-190/380	60/50	6.0/3.0	79	1800
444T-5013L	Radial	B	2	1735	Cast Iron S.D.	575	60	2.4	79	1800

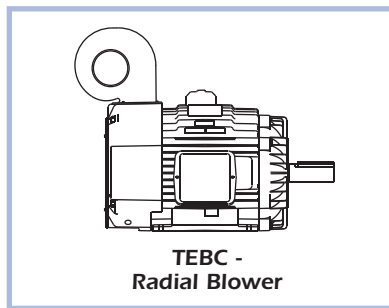
## Dripproof, Force Ventilated

Motor Frame	Type	Fig.	HP	RPM	Frame Construction	Volts	Hz	FLA's	Sound Pressure	Watts
364T-405T	Radial	C	1/75	3450/2850	Rolled Steel	230/460-190/380	60/50	3.7/1.85	68	1000
364T-405T	Radial	C	1	3450	Rolled Steel	575	60	1.5	68	1000
447T-510U	Radial	C	2	1735	Cast Iron S.D.	230/460-190/380	60/50	6.0/3.0	74	1800
447T-510U	Radial	C	2	1735	Cast Iron S.D.	575	60	2.4	74	1800



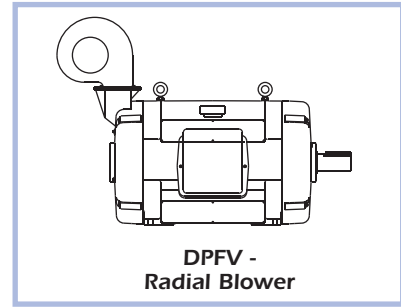
TEBC -  
Axial Blower

A



TEBC -  
Radial Blower

B



DPFV -  
Radial Blower

C

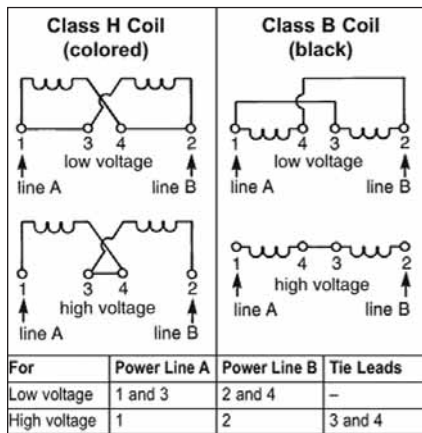
# Factory Modifications and Options (Build-Up) Brake Selection and Pricing

*Unless otherwise stated, brake torque is based on a minimum of 140% of the motor's full load torque. For holding brakes, lesser torque values can be utilized. The customer is responsible for proper brake torque specification and selection.*

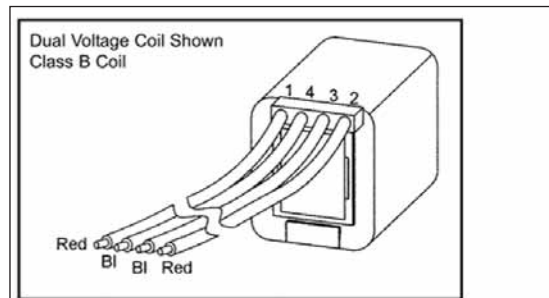
Motor HP	Static Torque Rating of Brake (lb-ft)						
	Brakemotor Shaft Speed (RPM)						
	700	900	1200	1500	1800	3000	3600
1/6	3	1.5	1.5	1.5	0.75	0.5	0.5
1/4	3	3	3	1.5	1.5	0.75	0.5
1/3	6	3	3	3	1.5	1.5	0.75
1/2	6	6	3	3	3	1.5	1.5
3/4	10	6	6	6	6	3	3
1	15	10	6	6	6	3	3
1-1/2	20	15	10	10	10	6	3
2	25	20	15	10	10	6	6
3	35	25	20	15	15	10	6
5	75	50	35	25	20	15	10
7-1/2	105	75	50	50	35	25	15
10	105	105	75	50	50	25	25
15	175	125	105	75	75	50	35
20	230	175	125	105	105	50	50
25	330	230	175	125	105	75	50
30	330	330	230	175	125	75	75
40	440	330	330	230	175	105	105
50	550	440	330	330	230	---	---
60	750	550	440	330	330	---	---
75	1000	750	550	440	330	---	---
100	---	1000	750	500	440	---	---
125	---	1000	1000	750	500	---	---
150	---	---	1000	750	750	---	---
200	---	---	---	1000	1000	---	---
250	---	---	---	---	1000	---	---

## Wiring Diagram - Dual Voltage Coil

1. Installation and wiring information is supplied with each brake to be read before any work.
2. The coil label lists the low and high voltage. The brake may be a 115 / 230 coil or a 230 / 460 coil. Check the coil before wiring.
3. Lifting and lowering loads should wire through a separate contact and relay.
4. Brake coils are rated at +/- 10% of the nameplate voltage. Brakes used with VFD must be wired to a separate contact and relay and not through the VFD.



Check coil nameplate to identify if voltage is high or low



Check the coil nameplate for voltage, inrush and maintained amperage requirements. Brake coils are fixed voltage and frequency, wire separately when using a variable power source (VFD). Keep wiring away from moving parts and pinch points.

# Factory Modifications and Options (Build-Up)

## Brake Selection and Pricing

Unless otherwise stated, brake torque is based on a minimum of 140% of the motor's full load torque. For holding brakes, lesser torque values can be utilized. The customer is responsible for proper brake torque specification and selection.

### Brake Provisions Only (Must add price for Brake)

Frame	TENV	TEFC	TEBC*	DPFV
56-145	\$53	---	---	---
182-184	\$71	---	---	---
213-215	\$105	\$505	---	---
254-256	\$134	\$534	---	---
284-286	\$192	\$1,192	\$3,929	---
324-326	\$298	\$1,298	\$4,169	---
364-365	\$420	\$1,420	\$4,269	\$420
404-405	\$609	\$1,609	\$4,502	\$609
444-449	\$638	\$1,638	\$4,736	\$638
505-510	---	---	---	\$763
5011-5013	\$1,000	\$2,000	\$7,000	\$1,000

\* - Includes radial blower

### Brake Adder

Torque rating	Maximum Speed		NEMA 2 (Std)	NEMA 4 (DTWP)	NEMA 4X (WashDown)	Hazardous Location*	Vertical Adder	
	Horizontal	Vertical					NEMA 2	NEMA 4
6	5000	3600	\$350	\$438	\$504	\$2,312	---	---
10	5000	3600	\$425	\$504	\$580	\$2,902	---	---
15	5000	3600	\$585	\$615	\$707	\$3,051	---	---
20	5000	3600	\$615	\$660	\$759	---	---	---
25	5000	3600	\$826	\$1,177	\$1,354	\$3,308	---	---
35	4000	3600	\$942	\$1,418	\$1,631	\$3,633	\$93	\$280
50	4000	3600	\$1,161	\$1,669	\$1,919	\$4,124	\$123	\$370
75	4000	3600	\$1,595	\$2,158	\$2,482	\$5,070	\$123	\$370
105	4000	3600	\$2,078	\$2,716	\$3,123	\$6,554	\$123	\$370
125	3600	2400	\$4,049	\$5,242	---	\$14,670	\$206	\$517
175	3600	2400	\$4,391	\$5,649	---	\$15,451	\$206	\$517
230	3600	2400	\$4,798	\$6,130	---	\$16,192	\$261	\$574
330	3600	2400	\$6,676	\$7,777	---	\$17,517	\$261	\$574
440	3600	2400	\$7,474	\$8,700	---	---	\$588	\$753
500	3600	2400	\$11,197	\$12,522	---	---	\$588	\$753
750	1800	1800	\$12,353	\$13,678	---	---	\$588	\$753
1000	1800	N/A	\$13,517	\$14,842	---	---	N/A	N/A

\* - Division 1 Explosion Proof, Class I Groups C & D, Class II Groups F & G. Contact factory for Vertical-Above or Vertical-Below modification.

#### MODIFICATIONS

Common modifications include the following. For others not listed, contact factory.

Brake Release Interlock	Add \$525
Class H Coil	Add \$125
Space Heaters	Add \$230
"IntelliBrake" encoder	See Below

### "IntelliBrake" option

"IntelliBrake" combines a Stearns or a Dings brake with an internally-mounted encoder. Benefits include improved encoder protection, simplified encoder mounting, ease of encoder replacement (no need to remove the entire brake), and reduced length.

An exclusive feature is the ability to integrate encoder feedback in a brakemotor package for Hazardous Locations (Div 1 Explosion Proof).

The following LIST PRICE ADDERS apply, which are in addition to the Brake Adders shown above:

	NEMA 2, 4 and 4X		Division 1 Explosion Proof	
	6-450 lb-ft	500-1000 lb-ft	6-75 lb-ft	105-330 lb-ft
Dings	\$2,800	N/A	\$4,700	N/A
Stearns	\$2,800	\$2,800	\$4,700	\$7,425

# DripProof, Rigid Base Inverter Duty

## Features:

- 10:1 Variable torque and 2:1 constant torque
- Class B insulation
- 1.15 Service Factor on sinewave, 1.0 Service Factor on IGBT power
- Ball bearings (roller bearings, as noted)
- Meets EPA efficiency levels where applicable
- UL Recognized and CSA Certified
- One year warranty on non-EPA motors
- Two year warranty on EPA motors



Suitable for use on VFD per guidelines on page 14

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES	C FACE KITS
<b>1/4</b>	1800	208-230/460	48	G044 ★	48T17D2000	<b>\$182</b>	F1	62.0	1.2-1.3/0.6	14	9.34	20,25	NA
<b>1/3</b>	1800	208-230/460	56	G047 ★	56T17D2095	<b>\$212</b>	F1	67.0	1.5-1.6/0.8	15	9.97	20,25	NA
<b>1/2</b>	1800	208-230/460	56	G063 ★	56T17D2094	<b>\$239</b>	F1	70.0	2.1-2.2/1.1	17	10.47	20,25,CF	NA
	1200	208-230/460	56	G067 ★	56T11D5302	<b>\$320</b>	F1	68.0	2.4-2.7/1.35	23	10.44	20	A435
<b>3/4</b>	3600	208-230/460	56	G080 ★	56T34D5301	<b>\$216</b>	F1	74.0	3.0-3.2/1.6	21	10.44	20	A435
	1800	208-230/460	56	G084 ★	56T17D2093	<b>\$267</b>	F1	75.5	2.7-2.8/1.4	20	10.97	20,25,CF	NA
	1800	575	56	G086 ★	56T17D2110	<b>\$267</b>	F1	75.5	1.1	20	10.97	25	NA
	1200	208-230/460	143T	H150 ★	143TTDR5376	<b>\$300</b>	E6	74.0	3.1-3.2/1.6	29	10.99	5,20	A436
<b>1</b>	3600	208-230/460	56	K000 ★	56T34D5302	<b>\$246</b>	F1	74.0	3.7-3.7/1.85	23	10.44		A435
	1800	208-230/460	56	K004 ★	56T17D2092	<b>\$274</b>	F1	76.5	3.4-3.4/1.7	22	11.47	20,25	NA
	1800	208-230/460	143T	<b>E715</b> ★	143TTDR5347	<b>\$278</b>	E2	82.5	3.3-3.1/1.55	34	12.49	5,13,20	A436
	1800	575	56	K049 ★	56T17D2130	<b>\$274</b>	F1	76.5	1.4	22	11.47	25	A435
	1800	575	143T	<b>E912</b> ★	143TTDR5351	<b>\$278</b>	E2	82.5	1.1	41	12.49	5,13	A436
	1200	230/460	145T	<b>E728</b> ★	145TTDR4076	<b>\$364</b>	E2	80.0	3.6/1.8	47	13.49	5,13,20	A436
<b>1 1/2</b>	3600	208-230/460	56	K009 ★	56T34D5303	<b>\$303</b>	F1	80.0	4.9-5.0/2.5	24	10.44	20	A435
	3600	208-230/460	143T	<b>E783</b> ★	143TTDR5313	<b>\$309</b>	E2	82.5	4.2-4.2/2.1	28	10.99	5,13,20	A436
	1800	208-230/460	145T	<b>E716</b> ★	145TTDR5630	<b>\$303</b>	E2	84.0	4.6-4.4/2.2	40	12.49	5,13,20	A436
	1800	575	145T	<b>E913</b> ★	145TTDR5640	<b>\$303</b>	E2	84.0	1.8	39	12.49	5,13	A436
	1200	230/460	182T	<b>E729</b> ★	182TTDR4076	<b>\$400</b>	E2	84.0	4.8/2.4	84	14.22	13,20,25	NA
<b>2</b>	3600	208-230/460	145T	<b>E702</b> ★	145TTDR5304	<b>\$364</b>	E2	84.0	5.4-5.2/2.6	29	11.49	5,13,20	A436
	1800	208-230/460	145T	<b>E717</b> ★	145TTDR5631	<b>\$334</b>	E2	84.0	6.2-5.8/2.9	43	12.99	5,13,20	A436
	1800	575	145T	<b>E914</b> ★	145TTDR5665	<b>\$334</b>	E2	84.0	2.3	42	12.99	5,13	A436
	1200	230/460	184T	<b>E730</b> ★	184TTDR4076	<b>\$514</b>	E2	85.5	6.2/3.1	87	15.22	13,20,25	NA
<b>3</b>	3600	208-230/460	145T	<b>E784</b> ★	145TTDR5325	<b>\$382</b>	E2	84.0	8.4-7.6/3.8	34	11.99	5,13,20	A436
	1800	208-230/460	182T	<b>E718</b> ★	182TTDB4026	<b>\$391</b>	E2	86.5	8.8-8.2/4.1	81	13.72	DS,13,20,25	NA
	1800	575	182T	<b>E915</b> ★	182TTDR4030	<b>\$391</b>	E2	86.5	3.3	72	13.19	13,25	NA
	1200	230/460	213T	<b>E731</b> ★	213TTDW4076	<b>\$695</b>	E2	86.5	8.4/4.2	104	17.30	20	A606
<b>5</b>	3600	208-230/460	182T	<b>E704</b> ★	182TTDR4001	<b>\$438</b>	E2	85.5	13.2-12.2/6.1	61	13.19	13,20,25	NA
	1800	208-230/460	184T	<b>E719</b> ★	184TTDB4026	<b>\$425</b>	E2	87.5	14.4-13.0/6.5	92	14.72	DS,13,20,25	NA
	1800	575	184T	<b>E916</b> ★	184TTDR4030	<b>\$425</b>	E2	87.5	5.2	89	13.69	13,25	NA
	1200	230/460	215T	<b>E732</b> ★	215TTDW4076	<b>\$809</b>	E2	87.5	14.0/7.0	135	18.55	13,20	A606
<b>7 1/2</b>	3600	208-230/460	184T	<b>E705</b> ★	184TTDR4001	<b>\$567</b>	E2	87.5	20.0-17.6/8.8	98	15.22	13,20,25	NA
	1800	208-230/460	213T	<b>E720</b> ★	213TTDBA4026	<b>\$591</b>	E2	88.5	21.4-19.6/9.8	102	17.30	DS	A606
	1800	575	213T	<b>E758</b> ★	213TTDW4030	<b>\$591</b>	E2	88.5	7.6	113	17.30	13	A606
	1200	230/460	254T	<b>E733</b> ★	254TTDX4076	<b>\$1,012</b>	E2	88.5	21.4/10.7	150	20.57	20	A612
<b>10</b>	3600	208-230/460	213T	<b>E706</b> ★	213TTDW4001	<b>\$736</b>	E2	88.5	26.0-23.4/11.7	111	17.30	13	A606
	1800	208-230/460	215T	<b>E721</b> ★	215TTDBA4026	<b>\$759</b>	E2	89.5	28.6-26.4/13.2	107	17.30	DS	A606
	1800	575	215T	<b>E759</b> ★	215TTDW4030	<b>\$759</b>	E2	89.5	10.0	123	17.30	13	A606
	1200	230/460	256T	<b>E734</b> ★	256TTDX4076	<b>\$1,180</b>	E2	90.2	28.0/14.0	221	22.32		A612
<b>15</b>	3600	208-230/460	215T	<b>E707</b> ★	215TTDW4001	<b>\$1,132</b>	E2	90.2	38.0-34.0/17.0	120	18.55	13,20	A606
	1800	208-230/460	254T	<b>E722</b> ★	254TTDB4026	<b>\$1,137</b>	E2	91.0	40.0-36.0/18.0	200	20.31	DS,13,20,25	NA
	1800	575	254T	<b>E760</b> ★	254TTDX4030	<b>\$1,137</b>	E2	91.0	15.3	184	22.32		A612
	1200	230/460	284T	<b>E735</b> ★	284TTDP4076	<b>\$1,697</b>	E2	90.2	39.0/19.5	328	23.49		A610

Blue shaded areas are cast iron frames.

★ Stock Model

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

### Footnotes:

- DS Sourced
- 5 56H, 143T and 145T combination base with 12 mounting holes
- 13 F1 mounting only, cannot reassemble to F2
- 20 Rated 60/50 hertz, 190/380 or 380 volt at next lower horsepower
- 25 Motor will NOT accept C-face kit
- CF Consult Factory for Accessory Kit and/or Modification Selection

Continued on next page.

INVERTER DUTY OBP

# Dripproof, Rigid Base

## Inverter Duty

INVERTER DUTY OBP

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES	C FACE KITS
<b>20</b>	3600	208-230/460	254T	<b>E708</b> ★	254TTDX4001	<b>\$1,334</b>	E2	91.0	52.0-46.2/23.1	187	22.32	20	A612
	1800	208-230/460	256T	<b>E723</b> ★	256TTDB4026	<b>\$1,388</b>	E2	91.0	54.0-47.0/23.5	232	22.05	DS,13,20	NA
	1800	575	256T	<b>E761</b> ★	256TTDX4032	<b>\$1,388</b>	E2	91.0	20.8	189	22.32		A612
	1200	230/460	286T	<b>E736</b>	286TTDP4076	<b>\$2,082</b>	E2	91.0	53.0/26.5	483	24.99		A610
<b>25</b>	3600	208-230/460	256T	<b>E709</b> ★	256TTDX4001	<b>\$1,628</b>	E2	91.0	63.0-58.0/29.0	214	22.32	20	A612
	1800	208-230/460	284T	<b>E724</b> ★	284TTDC4026	<b>\$1,612</b>	E2	93.0	66.0-60.0/30.0	414	23.49	DS,20	A287
	1800	575	284T	<b>E762</b> ★	284TTDP4035	<b>\$1,612</b>	E2	91.7	24.4	351	23.49		A610
	1200	230/460	324T	<b>E737</b> ★	324TTDP4076	<b>\$2,470</b>	E2	91.7	66.0/33.0	480	26.00	20	A613
<b>30</b>	3600	230/460	284TS	<b>E710</b> ★	284TSTDP4001	<b>\$1,943</b>	E2	91.0	72.0/36.0	286	22.06	20	A610
	1800	208-230/460	286T	<b>E725</b> ★	286TTDC4026	<b>\$1,875</b>	E2	92.4	80.0-70.0/35.0	411	24.99	DS,20	A287
	1800	575	286T	<b>E763</b> ★	286TTDP4034	<b>\$1,875</b>	E2	92.4	28.8	285	24.99		A610
	1200	230/460	326T	<b>E738</b> ★	326TTDP4076	<b>\$2,825</b>	E2	92.4	82.0/41.0	634	27.50		A613
<b>40</b>	3600	230/460	286TS	<b>E711</b> ★	286TSTDP4001	<b>\$2,486</b>	E2	91.7	94.0/47.0	321	23.56	20	A610
	1800	230/460	324T	<b>E726</b> ★	324TTDC4026	<b>\$2,332</b>	E2	93.0	93.0/46.5	489	26.00	DS,20	A613
	1800	230/460	324TS	<b>E789</b> ★	324TSTDP4032	<b>\$2,332</b>	E2	93.0	97.0/48.5	340	24.50		A613
	1800	575	324T	<b>E764</b> ★	324TTDP4028	<b>\$2,332</b>	E2	93.0	39.0	474	26.00		A613
<b>50</b>	1200	230/460	364T	<b>E746</b> ★	364TTDS4086	<b>\$4,153</b>	E2	93.0	104/52.0	688	28.62		A216
	3600	230/460	324TS	<b>E712</b> ★	324TSTDP4001	<b>\$2,954</b>	E2	92.4	117/58.5	437	24.50	20	A613
	1800	230/460	326T	<b>E727</b> ★	326TTDC4026	<b>\$2,718</b>	E2	93.0	118/59.0	602	27.50	DS,20	A613
	1800	230/460	326TS	<b>E791</b> ★	326TSTDP4036	<b>\$2,718</b>	E2	93.0	123/61.5	340	26.00	20	A613
<b>60</b>	1800	575	326T	<b>E765</b> ★	326TTDP4048	<b>\$2,718</b>	E2	93.0	49	510	27.50		A613
	1200	230/460	365T	<b>E747</b> ★	365TTDS4086	<b>\$4,850</b>	E2	93.0	124/62.0	743	29.62	20	A216
	3600	230/460	326TS	<b>E713</b> ★	326TSTDP4001	<b>\$3,359</b>	E2	93.0	136/67.5	454	26.00	20	A613
	1800	230/460	364T	<b>E739</b> ★	364TTDC4036	<b>\$3,332</b>	E2	93.6	142/71.0	751	28.62	DS	A216
<b>75</b>	1800	230/460	364TS	<b>E768</b> ★	364TSTDC4026	<b>\$3,332</b>	E2	93.6	142/71.0	750	26.50	DS,20	A219
	1200	230/460	404T	<b>E748</b> ★	404TTDS4086	<b>\$5,658</b>	E2	93.6	143/71.5	1135	32.50	20	A222
	3600	230/460	364TS	<b>E714</b> ★	364TSTDS4001	<b>\$4,478</b>	E2	93.0	183/91.5	710	26.50	20	A219
	1800	230/460	365T	<b>E740</b> ★	365TTDC4036	<b>\$4,058</b>	E2	94.1	176/88.0	820	29.62	DS,20	A216
<b>100</b>	1800	230/460	365TS	<b>E782</b> ★	365TSTDC4026	<b>\$4,058</b>	E2	94.1	176/88.0	779	27.50	DS,20	A219
	3600	230/460	365TS	<b>E753</b> ★	365TSTDS4001	<b>\$5,882</b>	E2	93.0	240/120	736	27.50	20	A219
	1800	230/460	404T	<b>E741</b> ★	404TTDS4036	<b>\$5,175</b>	E2	94.1	236/118	1040	32.50	20	A222
<b>125</b>	1800	230/460	404TS	<b>E780</b> ★	404TSTDS4026	<b>\$5,175</b>	E2	94.1	236/118	1013	29.50	20	A225
	3600	460	404TS	<b>E754</b> ★	404TSTDS4001	<b>\$6,905</b>	E2	93.6	142	975	29.50	PW	A225
	1800	460	405T	<b>E742</b> ★	405TTDS4036	<b>\$6,196</b>	E2	94.5	147	1112	34.00	PW	A222
<b>150</b>	1800	460	405TS	<b>E781</b> ★	405TSTDS4026	<b>\$6,196</b>	E2	94.5	147	1068	31.00	PW	A225
	3600	460	405TS	<b>E755</b> ★	405TSTDS4001	<b>\$8,901</b>	E2	93.6	169	1028	31.00	PW	A225
	1800	460	444T	<b>E743</b> ★	444TTDS4036	<b>\$8,949</b>	E2	95.0	176	1335	37.75	PW	A228
<b>200</b>	1800	460	444TS	<b>E792</b> ★	444TSTDS4026	<b>\$8,949</b>	E2	95.0	176	1276	34.00		A231
	3600	460	444TS	<b>E756</b> ★	444TSTDS4001	<b>\$11,634</b>	E2	94.5	225	1338	34.00	PW	A231
	1800	460	445T	<b>E744</b> ★	445TTDS4036	<b>\$11,305</b>	E2	95.0	233	1450	39.75	PW,RB	A228
<b>250</b>	1800	460	445TS	<b>U400</b> ★	445TSTDS4026	<b>\$8,949</b>	E2	95.0	233	1405	36.00	PW	A231
	1800	460	445T	H149	445TTDS7372	<b>\$11,662</b>	E6	95.0	287	1410	39.75	RB	A231
<b>300</b>	3600	460	447TS	H178	447TSTDN7001	<b>\$15,826</b>	E6	95.4	336	2255	39.50	F,YD	A293
	1800	460	447TS	H812	447TSTDN7026	<b>\$12,937</b>	E6	95.4	345	1952	39.50	F,YD	A293
<b>350</b>	3600	460	447TS	H193	447TSTDN7003	<b>\$18,128</b>	E6	95.4	385	2068	39.50	F,YD	A293
	1800	460	447TS	H813	447TSTDN7027	<b>\$14,278</b>	E6	95.8	405	2064	39.50	F,YD	A293
<b>400</b>	3600	460	447TS	H817	447TSTDN7005	<b>\$20,626</b>	E6	95.4	440	2150	39.50	F,YD	A293
	1800	460	447TS	H814	447TSTDN7028	<b>\$15,153</b>	E6	95.8	450	2214	39.50	F,YD	A293
<b>450</b>	3600	460	449TS	H818	449TSTDN7001	<b>\$21,030</b>	E6	95.8	495	2544	44.50	F,YD	A293
<b>500</b>	3600	460	449TS	H819	449TSTDN7003	<b>\$22,862</b>	E6	95.8	545	2542	44.50	F,YD	A293

Blue shaded areas are cast iron frames.

★ Stock Model

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

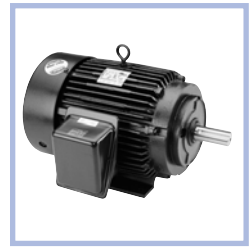
### Footnotes:

- DS Sourced
- F Class F Insulation
- PW Part winding start capability
- RB Roller bearing on shaft end for belted loads only
- YD 12 leads for WYE-DELTA, part winding or across-the-line starting
- 20 Rated 60/50 hertz, 190/380 or 380 volt at next lower horsepower

# Totally Enclosed, Rigid Base Inverter Duty

- Features:**
- 10:1 Variable Torque (see page 14 for constant torque capability)
  - Class F insulation
  - 1.15 Service Factor on sinewave, 1.0 Service Factor on IGBT power
  - Ball bearings (roller bearings, as noted)
  - Meets EPart efficiency levels where applicable
  - Rated 60/50 hertz, 190/380 or 380 volt, at next lower horsepower as footnoted
  - Will accept C-Face kits except where noted

- Severe duty upgrade available for cast iron frame motors
- Cast iron motors feature: shaft slinger, regreasable bearings (182T and larger), lead lugs (364T and larger), and bearing caps on 444T and larger
- UL Recognized and CSA Certified
- One year warranty on non-EPart motors
- Two year warranty on EPart motors



Suitable for use on VFD per guidelines on page 14

HP	RPM	VOLTS	FRAME	BRGS.	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES	C FACE KITS
<b>1/3</b>	1800	208-230/460	56	BALL	G303★	56T17F2034	\$224	F1	65.5	1.5-1.6/8	16	10.22	20,25	NA
	1200	208-230/460	56	BALL	G306★	56T11F5301	\$314	F1	62.0	1.9-2.2/1.1	22	11.32	20,25	A437
<b>1/2</b>	3600	208-230/460	56	BALL	G308★	56T34F5328	\$203	F1	66.0	2.1/2.2/1.1	22	11.82	20	A437
	1800	208-230/460	56	BALL	G321★	56T17F2035	\$250	F1	70.0	2.1-2.2/1.1	18	10.72	20,25	NA
	1200	208-230/460	56	BALL	G324★	56T11F5302	\$345	F1	68.0	2.4-2.7/1.3	24	11.82	20	A437
<b>3/4</b>	3600	208-230/460	56	BALL	G326★	56T34F5329	\$242	F1	74.0	3.0-3.2/1.6	24	11.82	20	A437
	3600	575	56	BALL	G327★	56T34F5334	\$242	F1	74.0	1.3	23	11.82		A437
	1800	208-230/460	56	BALL	G329★	56T17F2037	\$276	F1	75.5	2.7-2.8/1.4	22	11.22	20,25	NA
	1800	575	56	BALL	G340★	56T17F2046	\$276	F1	75.5	1.1	22	11.22	25	NA
	1200	208-230/460	56	BALL	G342★	56T11F5303	\$357	F1	74.0	3.1-3.2/1.6	28	12.32	20	A437
	<b>1</b>	3600	208-230/460	56	BALL	G344★	56T34F5330	\$272	F1	74.0	3.7-3.7/1.8	34	11.82	20
3600		575	56	BALL	G345★	56T34F5335	\$272	F1	74.0	1.5	24	11.82		A437
1800		208-230/460	56	BALL	G347★	56T17F5302	\$289	F1	77.0	3.5-3.6/1.8	27	12.32	20	A437
1800		208-230/460	143T	BALL	<b>E950★</b>	143TTFR4026	\$325	E8	82.5	3.2-3.0/1.5	38	12.87	20	A438
1800		208-230/460	143T	BALL	<b>E826★</b>	143TTTC4026	\$342	E1	85.5	3.2-3.0/1.5	51	10.43	DS,N,20	A603
1800		575	56	BALL	G348★	56T17F5307	\$289	F1	77.0	1.45	27	12.32		A437
1800		575	143T	BALL	<b>E827★</b>	143TTFR4030	\$325	E8	82.5	1.2	38	12.87		A438
1200		208-230/460	56H	BALL	G360★	56T11F5304	\$382	F1	77.0	3.95-4.0/2.0	35	12.82	5,20	A437
1200		230/460	145T	BALL	<b>E979★</b>	145TTFR4076	\$414	E8	80.0	3.4/1.7	39	13.37	20	A438
900		230/460	182T	BALL	L409★	182TTFS8101	\$661	E6	72.0	4.0/2.0	83	14.81	20	A644
<b>1 1/2</b>	3600	208-230/460	143T	BALL	<b>E832★</b>	143TTFR4001	\$342	E8	82.5	4.4-4.0/2.0	34	12.87	20	A438
	1800	208-230/460	56H	BALL	G365★	56T17F5303	\$330	F1	80.0	4.8-4.8/2.4	29	12.32	5,20	A437
	1800	230/460	145T	BALL	<b>E837★</b>	145TTTC4026	\$380	E1	84.0	4.6-4.2/2.1	58	11.43	DS,N,20	A655
	1800	208-230/460	145T	BALL	<b>E951★</b>	145TTFR4026	\$362	E8	84.0	4.6-4.0/2.2	45	14.37		A438
	1800	575	145T	BALL	<b>E838★</b>	145TTFR4038	\$362	E8	84.0	1.8	45	14.37		A438
	1200	230/460	182T	BALL	<b>E982★</b>	182TTFR4076	\$428	E8	85.5	5.0/2.5	106	14.97	20	A644
	900	230/460	184T	BALL	L410★	184TTFS8102	\$762	E6	74.0	5.8/2.9	94	15.81	20	A644
	<b>2</b>	3600	208-230/460	145T	BALL	<b>E994★</b>	145TTFR4001	\$342	E8	84.0	5.7-5.2/2.6	35	13.37	20
1800		208-230/460	145T	BALL	<b>E846★</b>	145TTTC4027	\$418	E1	84.0	6.0-5.6/2.8	63	11.43	DS,N,20	A655
1800		208-230/460	145T	BALL	<b>E952★</b>	145TTFR4027	\$397	E8	84.0	6.0-5.6/2.8	42	13.87		A438
1800		575	145T	BALL	<b>E847★</b>	145TTFR4039	\$397	E8	84.0	2.2	42	13.87		A438
1200		230/460	184T	BALL	<b>E995★</b>	184TTFR4076	\$470	E8	86.5	5.8/2.9	72	15.97	20	A644
900		230/460	213T	BALL	L411★	213TTFS8103	\$1,070	E6	80.0	8.0/4.0	153	18.22	20	A206
<b>3</b>	3600	208-230/460	182T	BALL	<b>E967★</b>	182TTFR4001	\$449	E8	85.5	8.2-7.4/3.7	69	14.97	20	A644
	1800	208-230/460	182T	BALL	<b>E953★</b>	182TTFB4026	\$425	E8	87.5	8.8-8.2/4.1	83	13.96	DS,20	A644
	1800	208-230/460	182T	BALL	<b>U607★</b>	182TTFC4026	\$447	E1	87.5	8.2-7.6/3.8	72	14.81	DS,20	A644
	1800	575	182T	BALL	<b>U608★</b>	182TTFR4040	\$425	E8	87.5	3.4	100	14.97		A644
	1800	575	182T	BALL	<b>U609★</b>	182TTFS4030	\$447	E1	87.5	3.35	98	14.81		A644
	1200	230/460	213T	BALL	<b>E980★</b>	213TTFW4076	\$624	E8	87.5	9.2/4.6	130	20.23	20	A609
	1200	208-230/460	213T	BALL	<b>U610★</b>	213TTFC4076	\$654	E1	89.5	9.8-9.4/4.7	148	18.19	DS,20	A652
	900	230/460	215T	BALL	L421★	215TTFS8101	\$1,394	E6	81.5	11.4/5.7	151	19.72	20	A206

Blue shaded areas are cast iron frames.

★ Stock Model

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPart and/or NRCan Canadian standards.

**Footnotes:**

- DS Sourced
- N Totally Enclosed, Non-Ventilated
- 5 56H, 143T and 145T combination base with 12 mounting holes

- 20 Rated 60/50 hertz, 190/380 or 380 volt at next lower horsepower
- 25 Motor will not accept C-face Kit

Continued on next page.

INVERTER DUTY TOTALLY ENCLOSED

# Totally Enclosed, Rigid Base

## Inverter Duty

HP	RPM	VOLTS	FRAME	BRGS.	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES	C FACE KITS
<b>5</b>	3600	208-230/460	184T	BALL	<b>E963</b> *	184TTFR4001	\$555	E8	87.5	13.4-12.4/6.2	81	15.97	20	A644
	3600	575	184T	BALL	<b>U615</b> *	184TTFS4005	\$582	E1	87.5	5.0	117	15.81	20	A644
	1800	208-230/460	184T	BALL	<b>E954</b> *	184TTFB4026	\$425	E8	87.5	14.2-13.0/6.5	105	14.96	DS,20	A643
	1800	208-230/460	184T	BALL	<b>U618</b> *	184TTFC4026	\$520	E1	87.5	14.0-13.0/6.5	112	15.81	DS,20	A644
	1800	575	184T	BALL	<b>U619</b> *	184TTFR4040	\$496	E8	87.5	5.2	115	15.97		A644
	1200	230/460	215T	BALL	<b>E970</b> *	215TTFW4076	\$897	E8	87.5	14.0/7.0	143	20.23	20	A609
	1200	208-230/460	215T	BALL	<b>U621</b> *	215TTFC4076	\$942	E1	89.5	16.2-16.0/8.0	176	19.61	DS	A652
	900	230/460	254T	BALL	L412*	254TTFPA8102	\$1,924	E6	84.0	17.0/8.5	325	23.69	20	A239
<b>7 1/2</b>	3600	230/460	213T	BALL	<b>E972</b> *	213TTFW4001	\$725	E8	88.5	18.4/9.2	114	18.73	20	A609
	1800	208-230/460	213T	BALL	<b>U629</b> *	213TTFC4026	\$746	E1	89.5	21.0-19.6/9.8	160	18.20	DS,20	A206
	1800	208-230/460	213T	BALL	<b>E955</b> *	213TTFW4026	\$711	E8	89.5	21.6-20.0/10.0	118	20.23	20	A609
	1800	575	213T	BALL	<b>U630</b> *	213TTFW4030	\$711	E8	89.5	8.0	135	18.73		A609
	1200	208-230/460	254T	BALL	<b>U633</b> *	254TTFC4076	\$1,239	E1	89.5	21.0-20.0/10.0	250	23.19	DS	A653
	900	230/460	256T	BALL	L413*	256TTFPA8102	\$2,449	E6	85.0	24.0/12.0	298	25.44	20	A239
	<b>10</b>	3600	230/460	215T	BALL	<b>E969</b> *	215TTFW4001	\$847	E8	89.5	24.0/12	128	20.23	20
3600		575	215T	BALL	<b>E821</b> *	215TTFW4005	\$847	E8	89.5	9.6	145	20.23		A609
1800		208-230/460	215T	BALL	<b>E956</b> *	215TTFW4026	\$861	E8	89.5	28.0-26.0/13.0	143	20.23	20	A609
1800		208-230/460	215T	BALL	<b>U639</b> *	215TTFC4026	\$904	E1	89.5	28.4-25.6/12.8	180	19.70	DS,20	A206
1800		575	215T	BALL	<b>U640</b> *	215TTFW4030	\$861	E8	89.5	10.4	138	20.23		A609
1200		208-230/460	256T	BALL	<b>U642</b> *	256TTFC4076	\$1,579	E1	89.5	28.3-26.2/13.1	277	24.92	DS	A653
900		230/460	284T	BALL	L414*	284TTFPA8102	\$2,902	E6	84.0	31.0/15.5	364	26.26	27	A617
<b>15</b>		3600	230/460	254T	BALL	<b>U644</b> *	254TTFPA4001	\$1,234	E1	90.2	36.0/18.0	258	23.69	20
	1800	208-230/460	254T	BALL	<b>E996</b> *	254TTFL14026	\$1,167	E8	91.0	42.0-40.0/20.0	186	22.99	AL,20	A1209
	1800	230/460	254T	BALL	<b>U647</b> *	254TTFC4026	\$1,226	E1	91.0	38.0/19.0	324	23.69	DS,20	A601
	1800	575	254T	BALL	<b>U648</b> *	254TTFNA4030	\$1,226	E1	91.0	15.6	322	23.52		A284
	1200	208-230/460	284T	BALL	<b>E978</b> *	284TTFC4076	\$2,132	E1	90.2	44.7-40.4/20.2	359	26.26	DS,20	A654
	900	230/460	286T	BALL	L415*	286TTFPA8102	\$3,813	E6	86.5	45.0/22.5	418	27.77	20	A617
	<b>20</b>	3600	230/460	256T	BALL	<b>U649</b> *	256TTFNA4001	\$1,620	E1	90.2	47.0/23.5	344	25.27	20
1800		208-230/460	256T	BALL	<b>E965</b> *	256TTFL14026	\$1,437	E8	91.0	55.0-51.0/25.5	289	26.24	AL,20	A1209
1800		230/460	256T	BALL	<b>U652</b> *	256TTFC4026	\$1,509	E1	91.0	51.0/25.5	436	25.44	DS,20	A601
1800		575	256T	BALL	<b>U653</b> *	256TTFNA4030	\$1,509	E1	91.0	20.0	340	25.27		A284
1200		208-230/460	286T	BALL	<b>E968</b> *	286TTFC4076	\$2,547	E1	90.2	58.2-52.6/26.3	408	27.83	DS,20	A654
900		230/460	324T	BALL	L416*	324TTFPA8104	\$4,595	E6	87.5	64.0/32.0	650	28.82	20	A619
<b>25</b>		3600	230/460	284TS	BALL	<b>E975</b> *	284TSTFPA4001	\$1,957	E1	91.0	60.0/30.0	392	24.89	20
	1800	208-230/460	284T	BALL	<b>E961</b> *	284TTFC4026	\$1,778	E1	92.4	64.0-58.0/29.0	478	26.44	DS,20	A611
	1800	208-230/460	284TS	BALL	<b>E999</b> *	284TSTFPA4036	\$1,778	E1	92.4	68.0-63.0/31.0	324	24.89	20	A617
	1800	575	284T	BALL	<b>E800</b> *	284TTFPA4030	\$1,778	E1	92.4	24.8	324	26.27		A617
	1200	230/460	324T	BALL	<b>E820</b> *	324TTFPA4076	\$3,089	E1	91.7	67.0/33.5	483	28.97	20	A619
	900	230/460	326T	BALL	L417*	326TTFPA8107	\$5,442	E6	88.5	78.0/39.0	620	30.47	20	A619
	<b>30</b>	3600	230/460	286TS	BALL	<b>E964</b> *	286TSTFPA4001	\$2,157	E1	91.0	72.0/36.0	430	26.39	20
1800		208-230/460	286T	BALL	<b>E983</b> *	286TTFC4026	\$2,159	E1	92.4	77.0-70.0/35.0	500	27.94	DS,20	A611
1800		208-230/460	286TS	BALL	<b>E818</b> *	286TSTFPA4036	\$2,159	E1	92.4	81.0-74.0/37.0	420	26.39	20	A617
1800		575	286T	BALL	<b>E817</b> *	286TTFPA4030	\$2,159	E1	92.4	29.6	480	27.77		A617
1200		230/460	326T	BALL	<b>E966</b> *	326TTFS4080	\$3,772	E1	91.7	76.0/38.0	691	30.37	20	A214
900		460	364T	BALL	L420*	364TTFS8101	\$6,105	E6	91.0	44.0	916	31.50	20	A395
<b>40</b>		3600	230/460	324TS	BALL	<b>E971</b> *	324TSTFPA4001	\$2,829	E1	91.7	95.0/47.5	520	27.47	20
	1800	208-230/460	324T	BALL	<b>E984</b> *	324TTFC4026	\$2,792	E1	93.0	102-92/46.0	606	28.82	DS,20	A614
	1800	230/460	324TS	BALL	<b>E816</b> *	324TSTFPA4036	\$2,792	E1	93.0	100/50.0	525	27.47	20	A619
	1800	575	324T	BALL	<b>E815</b> *	324TTFPA4030	\$2,792	E1	93.0	40.0	555	28.97		A619
	1200	230/460	364T	BALL	<b>E988</b> *	364TTFS4086	\$4,822	E1	93.0	102/51.0	888	31.50	20	A395
	900	460	365T	BALL	L425*	365TTFS8115	\$7,563	E6	91.0	55.5	970	32.50	20	A395

Blue shaded areas are cast iron frames.

\* Stock Model

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA act and/or NRCan Canadian standards.

**Footnotes:**

AL Aluminum Frame Construction  
 DS Sourced

20 Rated 60/50 hertz, 190/380 or 380 volt at next lower horsepower

Continued on next page.



# Totally Enclosed, Rigid Base Inverter Duty

HP	RPM	VOLTS	FRAME	BRGS.	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES	C FACE KITS
50	3600	230/460	326TS	BALL	<b>E976</b> *	326TSTFPA4001	\$3,922	E1	92.4	115/57.5	540	28.97	20	A619
	1800	230/460	326T	BALL	<b>E962</b> *	326TTFC4026	\$3,595	E1	93.0	117/58.5	655	30.32	DS,20	A614
	1800	230/460	326TS	BALL	<b>E801</b> *	326TSTFPA4036	\$3,595	E1	93.0	122/61.0	710	28.97	20	A619
	1800	575	326T	BALL	<b>U659</b> *	326TTFPA4030	\$3,595	E1	93.0	49.0	589	30.47		A619
	1200	230/460	365T	BALL	<b>E993</b> *	365TTFS4086	\$5,632	E1	93.0	124/62.0	967	32.50	20	A395
	900	460	404T	BALL	L426*	404TTFS8102	\$9,010	E6	92.4	69.0	1191	35.62	20	A223
60	3600	230/360	364TS	BALL	<b>E960</b> *	364TSTFS4001	\$5,613	E1	93.0	141/70.5	1135	29.38	20,89	A396
	1800	230/460	364T	BALL	<b>E985</b> *	364TTFC4036	\$5,275	E1	93.6	137/68.5	1016	31.50	DS,20	A217
	1800	230/460	364TS	BALL	<b>E802</b> *	364TSTFS4026	\$5,275	E1	93.6	144/72.0	945	29.38	20	A396
	1800	575	364T	BALL	<b>U660</b> *	364TTFS4040	\$5,275	E1	93.6	58.0	952	31.50		A395
	1200	230/460	404T	BALL	<b>E803</b> *	404TTFS4086	\$6,508	E1	93.6	144/72.0	1188	35.62	20	A223
	900	460	405T	BALL	L427*	405TTFS8114	\$10,448	E6	91.7	81.0	1340	37.12	20	A223
75	3600	230/460	365TS	BALL	<b>E991</b> *	365TSTFS4001	\$6,682	E1	93.0	174/87.0	997	30.38	20,89	A396
	1800	230/460	365T	BALL	<b>E957</b> *	365TTFS4036	\$6,742	E1	94.1	178/89.0	1025	32.50		A395
	1800	230/460	365TS	BALL	<b>E804</b> *	365TSTFS4026	\$6,742	E1	94.1	178/89.0	1026	30.38		A396
	1800	575	365T	BALL	<b>E805</b> *	365TTFS4040	\$6,742	E1	94.1	71.0	1035	32.50		A395
	1200	230/460	405T	BALL	<b>E806</b> *	405TTFS4086	\$7,821	E1	93.6	185/92.5	1298	37.12	20	A223
	900	460	444T	BALL	L428*	444TTFS8106	\$13,915	E6	93.0	97.0	1820	41.25	20	A229
100	3600	230/460	405TS	BALL	<b>E807</b> *	405TSTFS4001	\$9,016	E1	94.1	220/110	1239	34.12	20,89	A226
	1800	230/460	405T	BALL	<b>E959</b> *	405TTFS4036	\$8,132	E1	94.5	228/114	1277	37.12	20	A223
	1800	230/460	405TS	BALL	<b>E808</b> *	405TSTFS4026	\$8,132	E1	94.5	228/114	1273	34.12	20	A226
	1800	575	405T	BALL	<b>U661</b> *	405TTFS4040	\$8,132	E1	94.5	91.0	1267	37.12		A223
	1200	230/460	445T	BALL	<b>E809</b> *	444TTFS4086	\$11,007	E1	94.1	238/119	1819	41.25	20	A229
	900	460	445T	BALL	L429*	445TTFN8115	\$17,581	E6	93.6	133	2377	43.19	20	A620
125	3600	460	444TS	BALL	<b>E992</b> *	444TSTFS4001	\$12,569	E1	94.5	137	1731	37.50	PW	A232
	1800	460	444T	BALL	<b>E987</b> *	444TTFS4036	\$10,490	E1	94.5	142	1805	41.25	PW,20	A229
	1800	460	444TS	BALL	<b>E810</b> *	444TSTFS4026	\$10,490	E1	94.5	142	1787	37.50		A232
	900	460	445T	ROLLER	L440	445TTFN8102	\$20,442	E6	93.6	169	2377	43.19	H, RB,20	NA
150	3600	460	445TS	BALL	<b>E981</b> *	445TSTFN4001	\$15,054	E1	94.5	167	2191	39.44		A621
	1800	460	445T	BALL	<b>E986</b> *	445TTFN4036	\$10,490	E1	95.0	172	2116	43.19	20	A620
	1800	460	445TS	BALL	<b>E811</b> *	445TSTFN4026	\$12,758	E1	95.0	172	2070	39.44		A621
	1200	460	445T	ROLLER	<b>E958</b> *	445TTFN4087	\$14,751	E1	95.0	182	2275	43.19	H, RB	NA
	900	460	447/9T	ROLLER	L442*	449TTFS8111	\$23,061	E6	94.5	206	2967	51.86	H, RB,20	NA
200	3600	460	445TS	BALL	<b>E812</b> *	445TSTFN4005	\$18,811	E1	95.0	222	2262	39.44	H	A621
	1800	460	445T	ROLLER	<b>E989</b> *	445TTFN4038	\$15,500	E1	95.0	225	2287	43.19	RB,20	NA
	1800	460	445TS	BALL	<b>E813</b> *	445TSTFN4028	\$15,500	E1	95.0	225	2215	39.44		A621
	1200	460	447/9T	ROLLER	<b>E814</b> *	449TTFS4088	\$16,787	E1	95.0	243	2740	51.96	H, RB, YD	NA
	900	460	447/9T	ROLLER	L449*	449TTFS8110	\$23,456	E6	94.5	270	3389	51.88	H, RB, YD,20	NA
250	3600	460	447/9TS	BALL	L451*	449TSTFS8003	\$21,734	E9	95.0	280	2079	47.88	H, YD,20	A624
	1800	460	445T	ROLLER	L452*	445TTFN8040	\$17,695	E9	95.0	285	2395	43.19	H, RB, YD,20	NA
	1800	460	447/9T	ROLLER	L454*	449TTFS8038	\$17,695	E9	95.0	290	2775	51.86	H, RB, YD,20	NA
	1200	460	447/9T	ROLLER	L456*	449TTFS8087	\$19,767	E9	95.4	300	3394	51.86	H, RB, YD,20	NA
300	3600	460	447/9TS	BALL	L459*	449TSTFS8002	\$26,904	E9	95.4	330	2702	47.88	H, YD,20	A624
	1800	460	447/9T	ROLLER	L462*	449TTFS8037	\$19,903	E9	95.4	338	2960	51.86	H, RB, YD,20	NA
350	3600	460	447/9TS	BALL	L466*	449TSTFS8001	\$30,903	E9	95.4	380	3057	47.88	H, YD	A624
	1800	460	447/9T	ROLLER	L467	449TTFS8036	\$22,844	E9	95.4	400	3202	51.86	H, RB, YD	NA

Blue shaded areas are cast iron frames.

\* Stock Model

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

**Footnotes:**

- DS Sourced
- H Class H insulation
- PW Part winding start capability
- RB Roller bearing on shaft end for belted loads only
- YD 12 leads for WYE-DELTA, part winding, or across-the-line starting
- 20 Rated 60/50 hertz, 190/380 or 380 volt at next lower horsepower
- 89 Threaded NPT opening in conduit box

INVERTER DUTY TOTALLY ENCLOSED

# Totally Enclosed, C-Face with Removable Rigid Base

## Four-In-One, Inverter Duty



**Applications:** This unique design allows for replacement of Dripproof, TEFC, C-Face or Rigid Base motors in a broad range of industrial and commercial applications. General purpose use on gear reducers, pumps, machine tools, fans, blowers, material handling and other base mount or direct-coupled equipment installed in damp, dusty or dirty environments

- Features:**
- 10:1 Variable torque, Constant torque speed range as listed below
  - Class F insulation
  - CR<sup>200</sup> Corona Resistant, 200 C magnet wire
  - 1.15 Service Factor on sinewave, 1.0 Service Factor on IGBT power
  - Heavy gauge steel frame
  - Bolt-on removable rigid base
  - Suitable for horizontal or vertical mounting
  - Rated 60/50 hertz, 190/380 or 380 volt, at next lower horsepower (575 volt excluded)
  - Will accept brake kits (see page 73 and Mod Central section)
  - Will accept drip cover (see page 73 and Mod Central section)
  - UL Recognized and CSA Certified
  - One year warranty on non-EPAAct motors
  - Two year warranty in EPAAct motors



Suitable for use on VFD per guidelines on page 14

HP	RPM	VOLTS	NEMA FRAME	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	CT SPEED RANGE†	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES
<b>1/4</b>	1200	208-230/460	56C	G586★	56T11F5311	<b>\$321</b>	F2	2:1	1.7-2.0/1.0	21	11.31	
<b>1/3</b>	3600	208-230/460	56C	D390★	56T34T5303	<b>\$203</b>	F2	1000:1	1.7-1.8/.90	21	10.43	N,24
	3600	575	56C	K702★	56T34T5309	<b>\$203</b>	F2	1000:1	.80	18	9.93	N,13,24
	1800	208-230/460	56C	G580★	56T17T5305	<b>\$260</b>	F2	1000:1	1.4-1.6/.80	20	9.93	N,24
	1800	575	56C	K703★	56T17T5316	<b>\$260</b>	F2	1000:1	0.7	21	9.93	N,24
	1200	208-230/460	56C	G587★	56T11F5310	<b>\$338</b>	F2	10:1	1.9-2.2/1.1	23	11.31	
<b>1/2</b>	3600	208-230/460	56C	D391★	56T34F5301	<b>\$226</b>	F2	10:1	2.1-2.2/1.1	22	11.81	
	3600	575	56C	K704★	56T34F5348	<b>\$226</b>	F2	10:1	0.9	22	11.81	13
	1800	208-230/460	56C	G581★	56T17F5321	<b>\$288</b>	F2	10:1	2.3-2.4/1.2	23	11.81	
	1800	575	56C	K705★	56T17F5336	<b>\$288</b>	F2	10:1	1.0	25	11.81	
	1200	208-230/460	56C	G588★	56T11F5309	<b>\$368</b>	F2	10:1	2.4-2.7/1.35	24	11.81	
<b>3/4</b>	3600	208-230/460	56C	D392★	56T34F5302	<b>\$264</b>	F2	4:1	3.0-3.2/1.6	23	11.81	
	3600	575	56C	K706★	56T34F5349	<b>\$264</b>	F2	4:1	1.3	24	11.81	13
	1800	208-230/460	56C	G582★	56T17F5322	<b>\$315</b>	F2	10:1	2.6-3.0/1.5	25	11.81	
	1800	575	56C	K707★	56T17F5337	<b>\$315</b>	F2	10:1	1.2	25	11.81	
	1200	208-230/460	56C	G589★	56T11F5308	<b>\$379</b>	F2	4:1	3.1-3.2/1.6	28	12.31	
<b>1</b>	3600	208-230/460	56C	D393★	56T34F5303	<b>\$294</b>	F2	4:1	3.7-3.7/1.85	25	11.81	
	3600	575	56C	K708★	56T34F5350	<b>\$294</b>	F2	4:1	1.5	24	11.81	13
	1800	208-230/460	56HC	G583★	56T17F5323	<b>\$322</b>	F2	10:1	3.5-3.6/1.8	28	12.31	5
	1800	575	56HC	K709★	56T17F5338	<b>\$322</b>	F2	10:1	1.45	29	12.31	5
	1200	208-230/460	56HC	K701★	56T11F5307	<b>\$405</b>	F2	4:1	3.95-4.0/2.0	33	12.81	
<b>1 1/2</b>	3600	208-230/460	56C	D394★	56T34F5304	<b>\$351</b>	F2	2:1	4.7-4.6/2.3	26	11.81	
	3600	575	56C	K721★	56T34F5351	<b>\$351</b>	F2	2:1	1.8	26	11.81	13
	1800	208-230/460	56HC	G584★	56T17F5324	<b>\$352</b>	F2	2:1	4.8-4.8/2.4	30	12.31	5
	1800	575	56HC	K722★	56T17F5339	<b>\$352</b>	F2	2:1	1.9	31	12.31	5
<b>2</b>	3600	230/460	56HC	D395★	56T34F5305	<b>\$405</b>	F2	2:1	6.0-6.0/3.0	30	12.31	5
	3600	575	56HC	K723★	56T34F5352	<b>\$405</b>	F2	2:1	2.4	30	12.31	5,13
	1800	208-230/460	56HC	G585★	56T17F5325	<b>\$383</b>	F2	4:1	6.0-5.8/2.9	41	13.81	5
	1800	575	56HC	K724★	56T17F5340	<b>\$383</b>	F2	4:1	2.25	41	13.81	5
	1200	230/460	184TC	<b>C380★</b>	184TFFR4380	<b>\$707</b>	E8	10:1	6.0/3.0	72	15.29	

★ Stock Model

† Requires nameplate modification

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPAAct and/or NRCAn Canadian standards.

**Footnotes:**

- N Totally Enclosed, Non-Ventilated
- 5 56H, 143T, and 145T Combination Base with 12 mounting holes
- 13 F1 mounting only cannot reassemble to F2
- 24 Motor will NOT accept a Brake Kit

# Totally Enclosed, C-Face with Removable Rigid Base

## Four-In-One, Inverter Duty

HP	RPM	VOLTS	NEMA FRAME	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	CT SPEED RANGE†	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES
<b>3</b>	3600	208-230/460	56HC	D396★	56T34F5306	\$450	F2	2:1	8.4-7.6/3.8	41	13.31	5
	3600	575	56HC	K725★	56T34F5353	\$450	F2	2:1	3.1	40	13.31	5,13
	3600	208-230/460	182TC	<b>C381★</b>	182TTFR4320	\$707	E8	10:1	8.2-7.4/3.7	76	15.50	
	1800	230/460	56HCZ	G590★	56T17F5355	\$430	F2	NA	8.6/4.3	48	14.87	Z,5,17
	1800	208-230/460	182TC	<b>C382★</b>	182TTFR4340	\$632	E8	10:1	9.0-8.4/4.2	86	15.50	
	1800	575	182TC	<b>C383★</b>	182TTFR4345	\$632	E8	10:1	3.35	77	15.50	
	1200	208-230/460	213TC	<b>C384★</b>	213TTFW4380	\$884	E8	10:1	9.6-9.2/4.6	106	20.97	
<b>5</b>	3600	208-230/460	184TC	<b>C385★</b>	184TTFR4320	\$755	E8	10:1	13.5-12.5/6.2	81	16.50	
	1800	230/460	184TC	<b>C386★</b>	184TTFR4340	\$666	E8	10:1	13.0/6.5	87	16.50	
	1800	575	184TC	<b>C387★</b>	184TTFR4345	\$666	E8	10:1	5.2	72	16.50	
	1200	208-230/460	215TC	<b>C388★</b>	215TTFW4380	\$1,054	E8	10:1	15.0-14.0/7.0	143	22.22	
<b>7 1/2</b>	3600	208-230/460	213TC	<b>C389★</b>	213TTFW4320	\$980	E8	10:1	20.0-18.5/9.2	114	20.97	
	1800	208-230/460	213TC	<b>C390★</b>	213TTFW4340	\$884	E8	10:1	21.5-20.0/10.0	122	19.47	
	1800	575	213TC	<b>C391★</b>	213TTFW4345	\$884	E8	10:1	8.0	122	19.47	
<b>10</b>	3600	208-230/460	215TC	<b>C392★</b>	215TTFW4320	\$1,020	E8	10:1	27.0-24.0/12.0	128	20.97	
	1800	208-230/460	215TC	<b>C393★</b>	215TTFW4340	\$972	E8	10:1	28.0-26.0/13.0	135	20.97	
	1800	575	215TC	<b>C394★</b>	215TTFW4345	\$972	E8	10:1	10.5	135	20.97	

★ Stock Model

† Requires nameplate modification

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPCa and/or NRCa Canadian standards.

### Brake Kits (Through MOD Central)

TORQUE (LB-FT)	COIL VOLTAGE	CAT. NO.	LIST (LOOSE)	LIST (INSTALLED)	MULT. SYMB.	WEIGHT
<b>3</b>	208-230/460	A301★	\$355	\$	S4	10
	575	A297★	\$355	\$	S4	10
<b>6</b>	208-230/460	A302★	\$419	\$	S4	10
	575	A298★	\$419	\$	S4	10
<b>10</b>	208-230/460	A303★	\$518	\$	S4	10
	575	A299★	\$518	\$	S4	10

★ Stock Model

### Drip Cover Kits

CAT. NO.	FRAME	LIST PRICE	MULT. SYMB.
A234★	56-143T-145T	\$21	S4
A197★	182T-184T	\$24	S4
A199★	213T-215T	\$28	S4

★ Stock Model

#### Footnotes:

- Z 56HZ with 7/8" shaft diameter, 3 1/2" height, and slotted 56 Frame base
- 5 56H, 143T, and 145T Combination Base with 12 mounting holes
- 13 F1 mounting only cannot reassemble to F2
- 17 1.0 Service Factor

# NEMA Premium® Efficiency, XRI® Totally Enclosed, C-Face with Rigid Base

## Inverter Duty



**Applications:** General purpose use on gear reducers, pumps, machine tools, and other direct-coupled equipment installed in damp, dusty, or dirty environments, where long life and ultra-high efficiency are desired. Guaranteed efficiencies offer an **eXtra Return** on your **I**nvestment when using these premium efficiency motors on high cycle or long run applications.

**Features:**

- **Meets or exceeds NEMA Premium® efficiencies**
- 10:1 Variable torque and 10:1 Constant Torque
- Class F insulation system
- CR<sup>200</sup> Corona Resistant, 200 C rated magnet wire
- 1.15 Service Factor on sinewave, 1.0 Service Factor on IGBT power
- Rolled steel construction
- Top mounted conduit box (F3)
- Rated 60/50 hertz at same HP
- Ball Bearings
- UL Recognized and CSA Certified
- Three year warranty



INVERTER DUTY TOTALLY ENCLOSED

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	CT SPEED RANGE	LIST PRICE	MULT. SYMB.	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM	FOOT NOTES
<b>1</b>	3600	208-230/460	56C	<b>E2000</b> *	56T34F5940	10:1	<b>\$554</b>	E9	80.0	3.0-2.8/1.4	24	11.31	
	1800	208-230/460	143TC	<b>E2001</b> *	143TTFR5642	10:1	<b>\$445</b>	E9	85.5	3.2-3.2/1.6	32	13.75	
	1200	208-230/460	145TC	<b>E2002</b> *	145TTFR6078	10:1	<b>\$536</b>	E9	82.5	3.8-3.8/1.9	42	13.75	
<b>1 1/2</b>	3600	208-230/460	143TC	<b>E2003</b> *	143TTFR5582	10:1	<b>\$515</b>	E9	84.0	4.4-4.0/2.0	37	13.75	
	1800	208-230/460	145TC	<b>E2004</b> *	145TTFR6033	10:1	<b>\$485</b>	E9	86.5	5.2-4.8/2.4	34	13.75	
	1200	208-230/460	182TC	<b>E2005</b> *	182TTFR6076	10:1	<b>\$701</b>	E9	87.5	4.8-4.4/2.2	82	16.19	
<b>2</b>	3600	208-230/460	145TC	<b>E2006</b> *	145TTFR3002	10:1	<b>\$571</b>	E9	85.5	5.2-4.8/2.4	44	13.75	d
	1800	208-230/460	145TC	<b>E2007</b> *	145TTFR6035	10:1	<b>\$531</b>	E9	86.5	6.0-5.8/2.9	50	14.25	
	1200	208-230/460	184TC	<b>E2008</b> *	184TTFR6076	10:1	<b>\$803</b>	E9	88.5	6.4-6.0/3.0	94	17.19	
<b>3</b>	3600	208-230/460	182TC	<b>E2009</b> *	182TTFR6001	10:1	<b>\$740</b>	E9	87.5	8.0-7.6/3.8	83	15.69	d
	1800	208-230/460	182TC	<b>E2010</b> *	182TTFR6026	10:1	<b>\$664</b>	E9	89.5	8.4-8.0/4.0	87	16.19	
	1200	208-230/460	213TC	<b>E2011</b> *	213TTFW6076	10:1	<b>\$979</b>	E9	89.5	9.2-8.8/4.4	115	19.47	
<b>5</b>	3600	208-230/460	184TC	<b>E2012</b> *	184TTFR6001	10:1	<b>\$858</b>	E9	88.5	13.2-12.0/6.0	95	16.69	
	1800	208-230/460	184TC	<b>E2013</b> *	184TTFR6026	10:1	<b>\$775</b>	E9	90.2	13.8-12.4/6.2	110	17.19	
	1200	208-230/460	215TC	<b>E2014</b> *	215TTFW6076	10:1	<b>\$1,261</b>	E9	90.2	15.0-14.0/7.0	135	20.97	
<b>7 1/2</b>	3600	208-230/460	213TC	<b>E2015</b> *	213TTFW6001	10:1	<b>\$1,054</b>	E9	91.7	19.7-17.8/8.9	116	20.97	
	1800	208-230/460	213TC	<b>E2016</b> *	213TTFW6026	10:1	<b>\$957</b>	E9	91.7	21.0-19.4/9.7	143	20.97	
<b>10</b>	3600	208-230/460	215TC	<b>E2018</b> *	215TTFW6001	10:1	<b>\$1,122</b>	E9	91.7	26.4-23.6/11.8	137	22.22	
	1800	208-230/460	215TC	<b>E2019</b> *	215TTFW6026	10:1	<b>\$1,089</b>	E9	91.7	28.0-25.6/12.8	164	22.22	

\* Stock Model

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

**Footnotes:**

d To be discontinued after current stock is gone

# Premium Severe Duty/Chemical Processing, Three Phase, Inverter Duty NEMA Premium® Efficiency, Blue Chip XRI®

Totally Enclosed, Rigid Base

**Applications:** Chemical plants, paper mills, refineries, mines, food processing, foundries and other severe duty environments where long life and ultra-high efficiency are desired. Guaranteed efficiencies offer an **eXtra Return** on your **I**nvestment when using these premium efficiency motors on high cycle or long run applications.

- Features:**
- Meets or exceeds NEMA Premium® efficiencies, except where noted
  - Blue Chip quality, 100% cast iron construction for rigidity and reduced vibration
  - Provisions to add stub shaft for an encoder (184T-449T, TEFC only)
  - Internal and external epoxy paint
  - MAX GUARD® Class F insulation system
  - 1.15 Service Factor on sinewave, 1.0 Service Factor on IGBT power
  - Bearing caps (254T and larger)
  - Precision balanced
  - Extended grease tubes, regreasable in service
  - Brass drain and breather
  - Meets IEEE45 USCG Marine Duty, IP54 Construction
  - Meets Ford EM1 Automotive Duty Specifications
  - Division 2 CSA certification nameplate, for hazardous locations, Class I, Groups A, B, C, and D
  - Actual test and vibration data supplied with each motor
  - Ball bearing, except where noted
  - UL Recognized (through 449T), CSA Certified
  - Three year warranty



**Available with Nameplate Modification:**

- 2:1,20:1, or 1000:1 Constant Torque, 1.0 Service Factor on IGBT (PWM) power
- 1.25 Service factor through 40 HP (sinewave only)
- 50HZ at same HP, 1.0 Service factor through 40 HP (sinewave only)
- Contact Marathon Electric for optional nameplate markings on 50 HP and larger

Suitable for use on VFD per guidelines on page 14

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	CT SPEED RANGE†	LIST PRICE	MULT. SYMB.	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	“C” DIM.	FOOT NOTES	C FACE KITS	
<b>3/4</b>	1200	460	143T	E648 ★	143TTTN6576	1000:1	\$561	E9	80.0	1.4	53	10.43	N,75,76	A603	
	<b>1</b>	1800	460	143T	<b>E649</b> ★	143TTTN6526	1000:1	\$458	E9	85.5	1.5	55	10.43	N,75,76	A603
		1800	230/460	143T	<b>E461</b> ★	143TTTN6563	1000:1	\$458	E9	85.5	3.0/1.5	55	10.43	N,75,76	A603
		1800	575	143T	<b>E666</b> ★	143TTTN6530	1000:1	\$458	E9	85.5	1.2	55	10.43	N,75,76	A603
		1200	460	145T	<b>E650</b> ★	145TTTN6576	1000:1	\$576	E9	80.0	1.65	60	11.43	N,NP,75,76	A655
		1200	230/460	145T	<b>E462</b> ★	145TTTN6584	1000:1	\$576	E9	80.0	3.3/1.65	60	11.43	N,NP,75,76	A655
<b>1 1/2</b>	3600	460	143T	<b>E651</b> ★	143TTTN6501	1000:1	\$573	E9	86.5	2.0	58	10.43	N,75,76	A603	
	3600	230/460	143T	<b>E463</b> ★	143TTTN6502	1000:1	\$573	E9	86.5	4.0/2.0	58	10.43	N,75,76	A603	
	3600	575	143T	<b>E851</b> ★	143TTTN6505	1000:1	\$573	E9	86.5	1.6	58	10.43	N,75,76	A603	
	1800	460	145T	<b>E652</b> ★	145TTTN6526	1000:1	\$497	E9	84.0	2.2	65	11.43	N,NP,75,76	A655	
	1800	230/460	145T	<b>E464</b> ★	145TTTN6834	1000:1	\$497	E9	84.0	4.4/2.2	65	11.43	N,NP,75,76	A655	
	1800	575	145T	<b>E667</b> ★	145TTTN6529	1000:1	\$497	E9	84.0	1.8	65	11.43	N,NP,75,76	A655	
	1200	460	182T	<b>E632</b> ★	182TTTS6576	1000:1	\$737	E9	87.5	2.2	100	12.71	N,75	A644	
	1200	230/460	182T	<b>E465</b> ★	182TTTS6578	1000:1	\$737	E9	87.5	4.4/2.2	100	12.71	N,75	A644	
	<b>2</b>	3600	460	145T	<b>E653</b> ★	145TTTN6501	1000:1	\$601	E9	85.5	2.5	68	11.43	N,75,76	A655
		3600	230/460	145T	<b>E466</b> ★	145TTTN6521	1000:1	\$601	E9	85.5	5.0/2.5	68	11.43	N,75,76	A655
3600		575	145T	<b>E852</b> ★	145TTTN6505	1000:1	\$601	E9	85.5	2.0	68	11.43	N,75,76	A655	
1800		460	145T	<b>E654</b> ★	145TTTN6527	1000:1	\$546	E9	85.5	3.0	68	11.43	N,NP,75,76	A655	
1800		230/460	145T	<b>E467</b> ★	145TTTN6835	1000:1	\$546	E9	85.5	6.0/3.0	68	11.43	N,NP,75,76	A655	
1800		575	145T	<b>E668</b> ★	145TTTN6530	1000:1	\$546	E9	85.5	2.4	68	11.43	N,NP,75,76	A655	
1200		460	184T	<b>E633</b> ★	184TTTS6576	1000:1	\$911	E9	88.5	3.0	112	13.71	N,75	A644	
1200		230/460	184T	<b>E468</b> ★	184TTTS6582	1000:1	\$911	E9	88.5	6.0/3.0	112	13.71	N,75	A644	
<b>3</b>	3600	460	182T	<b>E601</b> ★	182TTTS6501	1000:1	\$825	E9	87.5	3.8	98	12.71	N,75	A644	
	1800	460	182T	<b>E616</b> ★	182TTTS6526	1000:1	\$740	E9	90.2	4.0	102	12.71	N,75	A644	
	1800	230/460	182T	<b>E470</b> ★	182TTTS6538	1000:1	\$740	E9	90.2	8.0/4.0	102	12.71	N,75	A644	
	1800	575	182T	<b>E669</b> ★	182TTTS6530	1000:1	\$740	E9	90.2	3.2	102	12.71	N,75	A644	
	1200	460	213T	<b>E634</b> ★	213TTFS6576	20:1	\$1,122	E9	89.5	4.4	176	18.22	75	A206	
	1200	230/460	213T	<b>E471</b> ★	213TTFS6594	20:1	\$1,122	E9	89.5	8.8/4.4	176	18.22	75	A206	

Blue shaded areas are cast iron frames.

★ Stock Model + Requires nameplate modification Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPCa and/or NRCa Canadian standards.

**Footnotes:**

- N Totally Enclosed, Non-Ventilated
- NP Does not meet NEMA Premium® efficiency

- 75 Addition of C Face Kit may result in non NEMA “BA” dimension; for the resulting “BA” dimension, consult the chart found in the modification section
- 76 Addition of C Face Kit results in Non NEMA “AH” dimension. NEMA “AH” is 2.12; rework “AH” is 2.38”

Continued on next page.

INVERTER DUTY TOTALLY ENCLOSED

# Premium Severe Duty/Chemical Processing, Three Phase, Inverter Duty NEMA Premium® Efficiency, Blue Chip XRI®

Totally Enclosed, Rigid Base

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	CT SPEED RANGE†	LIST PRICE	MULT. SYMB.	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES	C FACE KITS
5	3600	460	184T	<b>E602</b> ★	184TTFS6501	20:1	\$917	E9	89.5	5.9	142	16.19	75	A644
	3600	230/460	184T	<b>E472</b> ★	184TTFS6810	20:1	\$917	E9	89.5	11.8/5.9	142	16.19	75	A644
	3600	575	184T	<b>E655</b> ★	184TTFS6505	20:1	\$917	E9	89.5	4.7	142	16.19	75	A644
	1800	460	184T	<b>E617</b> ★	184TTFS6526	20:1	\$858	E9	90.2	6.2	130	16.19	75	A644
	1800	230/460	184T	<b>E473</b> ★	184TTFS6844	20:1	\$858	E9	90.2	12.4/6.2	130	16.19	75	A644
	1800	575	184T	<b>E670</b> ★	184TTFS6530	20:1	\$858	E9	90.2	5.0	130	16.19	75	A644
	1200	460	215T	<b>E635</b> ★	215TTFS6576	20:1	\$1,378	E9	89.5	6.9	202	19.72	75	A206
	1200	230/460	215T	<b>E474</b> ★	215TTFS6881	20:1	\$1,378	E9	89.5	13.8/6.9	202	19.72	75	A206
	1200	575	215T	<b>E683</b> ★	215TTFS6580	20:1	\$1,378	E9	89.5	5.5	202	19.72	75	A206
7 1/2	3600	460	213T	<b>E603</b> ★	213TTTS6501	2:1	\$1,108	E9	91.7	8.9	200	17.19	75,N	A206
	3600	230/460	213T	<b>E475</b> ★	213TTTS6502	2:1	\$1,108	E9	91.7	17.8/8.9	200	17.19	75,N	A206
	3600	575	213T	<b>E656</b> ★	213TTTS6505	2:1	\$1,108	E9	91.7	7.1	200	17.19	75,N	A206
	1800	460	213T	<b>E618</b> ★	213TTFS6526	20:1	\$1,051	E9	91.7	9.6	200	19.72	75	A206
	1800	230/460	213T	<b>E476</b> ★	213TTFS6531	20:1	\$1,051	E9	91.7	19.2/9.6	200	19.72	75	A206
	1800	575	213T	<b>E671</b> ★	213TTFS6530	20:1	\$1,051	E9	91.7	7.7	200	19.72	75	A206
	1200	460	254T	<b>E636</b> ★	254TTFNA6576	20:1	\$1,786	E9	91.0	9.9	326	23.52	75	A284
	1200	230/460	254T	<b>E477</b> ★	254TTFNA6590	20:1	\$1,786	E9	91.0	19.8/9.9	326	23.52	75	A284
	1200	575	254T	<b>E684</b> ★	254TTFNA6578	20:1	\$1,786	E9	91.0	7.9	326	23.52	75	A284
10	3600	460	215T	<b>E604</b> ★	215TTFS6501	2:1	\$1,293	E9	91.7	11.8	218	19.72	75	A206
	3600	230/460	215T	<b>E478</b> ★	215TTFS6807	2:1	\$1,293	E9	91.7	23.6/11.8	218	19.72	75	A206
	3600	575	215T	<b>E657</b> ★	215TTFS6505	2:1	\$1,293	E9	91.7	9.5	218	19.72	75	A206
	1800	460	215T	<b>E619</b> ★	215TTFS6526	20:1	\$1,266	E9	91.7	12.5	225	19.72	75	A206
	1800	230/460	215T	<b>E479</b> ★	215TTFS6527	20:1	\$1,266	E9	91.7	25.0/12.5	225	19.72	75	A206
	1800	575	215T	<b>E672</b> ★	215TTFS6530	20:1	\$1,266	E9	91.7	10.0	225	19.72	75	A206
	1200	460	256T	<b>E637</b> ★	256TTFNA6576	20:1	\$2,182	E9	91.0	13.1	405	25.27	75	A284
	1200	230/460	256T	<b>E480</b> ★	256TTFNA6596	20:1	\$2,182	E9	91.0	26.2/13.1	405	25.27	75	A284
	1200	575	256T	<b>E685</b> ★	256TTFNA6578	20:1	\$2,182	E9	91.0	10.5	405	25.27	75	A284
15	3600	460	254T	<b>E605</b> ★	254TTFNA6501	2:1	\$1,732	E9	91.7	17.5	345	23.52	75	A284
	3600	230/460	254T	<b>E481</b> ★	254TTFNA6515	2:1	\$1,732	E9	91.7	35.0/17.5	345	23.52	75	A284
	3600	575	254T	<b>E658</b> ★	254TTFNA6503	2:1	\$1,732	E9	91.7	14.2	345	23.52	75	A284
	1800	460	254T	<b>E620</b> ★	254TTFNA6526	20:1	\$1,626	E9	92.4	18.8	350	23.52	75	A284
	1800	230/460	254T	<b>E482</b> ★	254TTFNA6529	20:1	\$1,626	E9	92.4	37.6/18.8	350	23.52	75	A284
	1800	575	254T	<b>E673</b> ★	254TTFNA6528	20:1	\$1,626	E9	92.4	15.0	350	23.52	75	A284
	1200	460	284T	<b>E638</b> ★	284TTFNA6576	20:1	\$2,896	E9	91.7	20.4	479	26.34		A618
	1200	230/460	284T	<b>E483</b> ★	284TTFNA6876	20:1	\$2,896	E9	91.7	40.8/20.4	479	26.34		A618
	1200	575	284T	<b>E694</b> ★	284TTFNA6580	20:1	\$2,896	E9	91.7	16.3	479	26.34		A618
20	3600	460	256T	<b>E606</b> ★	256TTFNA6501	2:1	\$2,146	E9	92.4	23.4	375	25.27	75	A284
	3600	230/460	256T	<b>E484</b> ★	256TTFNA6523	2:1	\$2,146	E9	92.4	47.0/23.4	375	25.27	75	A284
	3600	575	256T	<b>E659</b> ★	256TTFNA6503	2:1	\$2,146	E9	92.4	18.7	375	25.27	75	A284
	1800	460	256T	<b>E621</b> ★	256TTFNA6526	20:1	\$2,026	E9	93.0	24.1	425	25.27	75	A284
	1800	230/460	256T	<b>E485</b> ★	256TTFNA6529	20:1	\$2,026	E9	93.0	48.0/24.1	425	25.27	75	A284
	1800	575	256T	<b>E674</b> ★	256TTFNA6528	20:1	\$2,026	E9	93.0	19.3	425	25.27	75	A284
	1200	460	286T	<b>E639</b> ★	286TTFNA6576	20:1	\$3,528	E9	91.7	26.8	550	27.84	75	A618
	1200	230/460	286T	<b>E486</b> ★	286TTFNA6876	20:1	\$3,528	E9	91.7	53.6/26.8	550	27.84		A618
	1200	575	286T	<b>E695</b> ★	286TTFNA6580	20:1	\$3,528	E9	91.7	21.4	550	27.84		A618
25	3600	460	284TS	<b>E607</b> ★	284TSTFNA6501	2:1	\$2,644	E9	93.6	28.1	481	24.97		A618
	3600	575	284TS	<b>E660</b> ★	284TSTFNA6502	2:1	\$2,644	E9	93.6	22.5	481	24.97		A618
	1800	460	284T	<b>E622</b> ★	284TTFNA6526	20:1	\$2,413	E9	93.6	31.0	478	26.34		A618
	1800	230/460	284T	<b>E488</b> ★	284TTFNA6837	20:1	\$2,413	E9	93.6	62.0/31.0	478	26.34		A618
	1800	575	284T	<b>E675</b> ★	284TTFNA6527	20:1	\$2,413	E9	93.6	24.8	478	26.34		A214
	1200	460	324T	<b>E640</b> ★	324TTFS6576	20:1	\$4,276	E9	93.0	32.5	675	28.87		A214
	1200	575	324T	<b>E696</b> ★	324TTFS6577	20:1	\$4,276	E9	93.0	26.0	675	28.87		A214

INVERTER DUTY TOTALLY ENCLOSED

Blue shaded areas are cast iron frames.

★ Stock Model

† Requires nameplate modification

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

**Footnotes:**

- N Totally Enclosed, Non-Ventilated
- 75 Addition of C Face Kit may result in non NEMA "BA" dimension; for the resulting "BA" dimension, consult the chart found in the modification section

Continued on next page.

# Premium Severe Duty/Chemical Processing, Three Phase, Inverter Duty NEMA Premium® Efficiency, Blue Chip XRI®

Totally Enclosed, Rigid Base

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	CT SPEED RANGE†	LIST PRICE	MULT. SYMB.	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES	C FACE KITS
<b>30</b>	3600	460	286TS	<b>E608</b> *	286TSTFNA6501	2:1	\$3,087	E9	93.6	34.1	500	26.47		A618
	3600	230/460	286TS	<b>E490</b> *	286TSTFNA6804	2:1	\$3,087	E9	93.6	67.5/34.0	500	26.47		A618
	1800	460	286T	<b>E623</b> *	286TTFNA6526	20:1	\$2,805	E9	94.1	36.5	525	27.84		A618
	1800	230/460	286T	<b>E491</b> *	286TTFNA6570	20:1	\$2,805	E9	94.1	73.0/36.5	525	27.84		A618
	1800	575	286T	<b>E676</b> *	286TTFNA6527	20:1	\$2,805	E9	94.1	29.2	525	27.84		A214
	1200	460	326T	<b>E641</b> *	326TTFS6576	20:1	\$4,926	E9	93.0	38.5	725	30.37		A214
	1200	575	326T	<b>E400</b>	326TTFS6580	20:1	\$4,926	E9	93.0	31.0	725	30.37		A214
<b>40</b>	3600	460	324TS	<b>E609</b> *	324TSTFS6501	2:1	\$4,072	E9	93.6	47.0	656	27.37		A214
	3600	575	324TS	<b>E662</b> *	324TSTFS6505	2:1	\$4,072	E9	93.6	37.5	656	27.37		A214
	1800	460	324T	<b>E624</b> *	324TTFS6526	20:1	\$3,726	E9	94.1	47.5	700	30.37		A214
	1800	575	324T	<b>E677</b> *	324TTFS6527	20:1	\$3,726	E9	94.1	38.0	700	30.37		A214
	1200	460	364T	<b>E642</b> *	364TTFS6586	20:1	\$6,675	E9	93.6	50.0	950	31.50	NP	A395
	1200	575	364T	<b>E401</b>	364TTFS6590	20:1	\$6,675	E9	93.6	40.0	950	31.50	NP	A395
<b>50</b>	3600	460	326TS	<b>E610</b> *	326TSTFS6501	2:1	\$5,268	E9	93.6	58.0	725	28.87		A214
	3600	575	326TS	<b>E663</b> *	326TSTFS6502	2:1	\$5,268	E9	93.6	46.5	725	28.87		A214
	1800	460	326T	<b>E625</b> *	326TTFS6526	20:1@	\$4,576	E9	94.5	60.0	775	31.87		A214
	1800	460	326TS	<b>E453</b> *	326TSTFS6536	20:1@	\$4,576	E9	94.5	60.0	775	28.87		A214
	1800	575	326T	<b>E678</b> *	326TTFS6527	20:1@	\$4,576	E9	94.5	48.0	775	30.37		A214
	1200	460	365T	<b>E643</b> *	365TTFS6586	20:1@	\$7,666	E9	93.6	61.5	955	32.50	NP	A395
	1200	575	365T	<b>E402</b>	365TTFS6590	20:1@	\$7,666	E9	93.6	49.0	955	32.50	NP	A395
<b>60</b>	3600	460	364TS	<b>E611</b> *	364TSTFS6501	2:1	\$6,929	E9	94.5	67.0	954	29.38		A396
	3600	575	364TS	<b>E664</b> *	364TSTFS6505	2:1	\$6,929	E9	94.5	53.5	954	29.38		A396
	1800	460	364T	<b>E626</b> *	364TTFS6536	20:1@	\$6,565	E9	95.0	69.0	980	31.50		A395
	1800	460	364TS	<b>E454</b> *	364TSTFS6526	20:1@	\$6,565	E9	95.0	69.0	980	29.38		A396
	1800	575	364T	<b>E679</b> *	364TTFS6537	20:1@	\$6,565	E9	95.0	55.0	980	31.50		A398
	1200	460	404T	<b>E644</b> *	404TTFS6586	20:1@	\$8,982	E9	94.5	72.0	1156	35.62		A223
	1200	575	404T	<b>E403</b>	404TTFS6592	20:1@	\$8,982	E9	94.5	57.5	1156	35.62		A223
	<b>75</b>	3600	460	365TS	<b>E612</b> *	365TSTFS6501	2:1	\$8,702	E9	94.5	84.0	1002	30.38	
3600		575	365TS	<b>E665</b> *	365TSTFS6502	2:1	\$8,702	E9	94.5	67.0	1002	30.38		A396
1800		460	365T	<b>E627</b> *	365TTFS6536	20:1@	\$8,322	E9	95.4	86.0	1100	32.50		A395
1800		460	365TS	<b>E455</b> *	365TSTFS6526	20:1@	\$8,322	E9	95.4	86.0	1100	30.38		A396
1800		575	365T	<b>E680</b> *	365TTFS6537	20:1@	\$8,322	E9	95.4	69.0	1100	32.50		A395
1200		460	405T	<b>E645</b> *	405TTFS6586	20:1@	\$10,574	E9	94.5	90.0	1280	37.12		A223
1200		575	405T	<b>E404</b>	405TTFS6587	20:1@	\$10,574	E9	95.0	71.5	1280	37.12		A223
<b>100</b>	3600	460	405TS	<b>E613</b> *	405TSTFS6501	2:1	\$11,660	E9	95.0	108	1295	34.12		A226
	3600	575	405TS	<b>E493</b>	405TSTFS6502	2:1	\$11,660	E9	95.0	87.0	1295	34.12		A226
	1800	460	405T	<b>E628</b> *	405TTFS6536	20:1@	\$10,282	E9	95.4	113	1330	37.12		A223
	1800	460	405TS	<b>E456</b> *	405TSTFS6526	20:1@	\$10,282	E9	95.4	113	1330	34.12		A226
	1800	575	405T	<b>E681</b> *	405TTFS6538	20:1@	\$10,282	E9	95.4	90.5	1330	37.12		A223
	1200	460	444T	<b>E646</b> *	444TTFS6586	20:1@	\$14,451	E9	94.5	119	1690	41.25	NP	A229
	1200	575	444T	<b>E405</b>	444TTFS6590	20:1@	\$15,592	E9	94.5	95.0	1690	41.25	NP	A229
<b>125</b>	3600	460	444TS	<b>E614</b> *	444TSTFS6501	2:1	\$15,243	E9	95.4	136	1725	37.50		A232
	3600	575	444TS	<b>E494</b>	444TSTFS6505	2:1	\$15,243	E9	95.4	109	1725	37.50		A232
	1800	460	444T	<b>E629</b> *	444TTFS6536	20:1@	\$13,535	E9	95.4	141	1725	41.25		A229
	1800	460	444TS	<b>E457</b> *	444TSTFS6526	20:1@	\$13,535	E9	95.4	141	1725	37.50		A232
	1800	575	444T	<b>E697</b> *	444TTFS6540	20:1@	\$13,535	E9	95.4	113	1725	41.25		A229
	1200	460	445T	<b>E647</b> *	445TTFN6586	20:1@	\$17,750	E9	95.0	155	2000	43.26		A620
	1200	575	445T	<b>E406</b>	445TTFN6590	20:1@	\$17,750	E9	95.0	124	2000	43.26		A620

INVERTER DUTY TOTALLY ENCLOSED

Blue shaded areas are Cast Iron Frames

\* Stock Model

† Requires nameplate modification  
@ Requires larger fan

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

**Footnotes:**

NP Does not meet NEMA Premium® efficiency

Continued on next page

# Premium Severe Duty/Chemical Processing, Three Phase, Inverter Duty NEMA Premium® Efficiency, Blue Chip XRI®

Totally Enclosed, Rigid Base

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	CT SPEED RANGE†	LIST PRICE	MULT. SYMB.	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES	C FACE KITS
<b>150</b>	3600	460	445TS	<b>E615</b> ★	445STFN6501	2:1	\$18,311	E9	95.8	165	2187	39.44		A621
	3600	575	445TS	<b>E495</b>	445STFN6502	2:1	\$18,311	E9	95.8	132	2187	39.44		A621
	1800	460	445T	<b>E630</b> ★	445TTFN6536	20:1@	\$15,736	E9	95.8	172	2070	43.26		A620
	1800	460	445TS	<b>E458</b> ★	445STFN6526	20:1@	\$15,736	E9	95.8	172	2070	39.44		A621
	1800	575	445T	<b>E682</b> ★	445TTFN6537	20:1@	\$15,736	E9	95.8	138	2070	43.26		A620
	1200	460	445T	<b>E448</b> ★	445TTFN6587	20:1@	\$19,859	E9	95.8	181	2500	43.26	H, RB	NA
	1200	575	445T	<b>E407</b>	445TTFN6591	20:1@	\$19,859	E9	95.8	145	2500	43.26	RB	NA
<b>200</b>	3600	460	445TS	<b>E449</b> ★	445STFN6505	2:1	\$23,164	E9	95.8	222	2300	39.44	H	A621
	3600	575	445TS	<b>E496</b>	445STFN6506	2:1	\$23,164	E9	95.8	178	2300	39.44		A621
	1800	460	445T	<b>E631</b> ★	445TTFN6538	20:1@	\$19,138	E9	96.2	226	2437	43.26	RB	NA
	1800	460	445TS	<b>E459</b> ★	445STFN6528	20:1@	\$19,138	E9	96.2	226	2437	39.44	H	A621
	1800	460	447/9T	<b>E770</b> ★	449TTFS6530	20:1@	\$22,009	E9	96.5	225	2700	51.69	H	A623
	1800	460	447/9T	<b>E854</b> ★	449TTFS6540	20:1@	\$22,009	E9	96.5	225	2700	51.69	H, RB	NA
	1800	575	447/9T	<b>E856</b> ★	449TTFS6564	20:1@	\$22,009	E9	96.5	180	2700	51.69	H, RB	NA
	1200	460	447/9T	<b>E773</b> ★	449TTFS6578	20:1@	\$24,311	E9	95.8	240	2927	51.69	H	A623
	1200	460	447/9T	<b>E687</b> ★	449TTFS6588	20:1@	\$24,311	E9	95.8	240	2927	51.69	H, RB	NA
	1200	575	447/9T	<b>E408</b>	449TTFS6582	20:1@	\$24,311	E9	95.8	192	2927	51.69	H, RB	NA
<b>250</b>	3600	460	447/9TS	E699	449STFS6503	2:1	\$29,214	E9	96.5	274	2700	47.88	H	A624
	1800	460	445T	E450 ★	445TTFN6540	20:1@	\$24,011	E9	95.8	285	2450	43.26	H, RB	NA
	1800	460	447/9T	E771 ★	449TTFS6528	20:1@	\$27,612	E9	96.5	285	2830	51.69	H	A623
	1800	460	447/9T	E690 ★	449TTFS6538	20:1@	\$27,612	E9	96.5	285	2830	51.69	H, RB	NA
	1200	460	447/9T	E774	449TTFS6577	20:1@	\$27,946	E9	95.8	300	3415	51.69	H	A623
	1200	460	447/9T	E688	449TTFS6587	20:1@	\$27,946	E9	95.8	300	3415	51.69	H, RB	NA
<b>300</b>	3600	460	447/9TS	E698	449STFS6502	2:1	\$37,866	E9	96.2	330	2700	47.88	H	A624
	1800	460	447/9T	E691 ★	449TTFS6537	20:1@	\$27,438	E9	96.5	339	3211	51.69	H, RB	NA
	1800	460	447/9T	E772	449TTFS6527	20:1@	\$27,438	E9	96.5	339	3211	51.69	H	A623
	1800	575	447/9T	E345	449TTFS16534	20:1@	\$27,438	E9	96.5	271	3211	51.69	RB	NA
<b>350</b>	3600	460	447/9TS	E769	449STFS6501	2:1	\$43,424	E9	96.2	382	3064	47.88	H	A624
	1800	460	447/9T	E692 ★	449TTFS6536	2:1	\$35,804	E9	96.2	395	3350	51.69	H, RB	NA

INVERTER DUTY TOTALLY ENCLOSED

Blue shaded areas are Cast Iron Frames

★ Stock Model

+ Requires nameplate modification

@ Requires larger fan

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

## Encoder Stub Shaft Kit For 184T-449T Frames (TEFC only)

CAT. NO.	KIT NO.	LIST PRICE KIT ONLY	LIST PRICE INSTALLED
A807	KIT STUB SHAFT 1 IN	\$150	\$350

### Footnotes:

A NEMA Design A

H Class H Insulation

RB Roller Bearing on shaft end for belted loads only

77 Frame size is drilled with three sets of footholes, 5010, 5011, and 5012 as standard. Foothole drilling for 5009 available upon request, as a build-up

78 Frame size is drilled with two sets of footholes, 5012 and 5013 standard

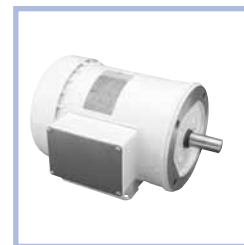
79 Ball bearings on both ends suitable for direct connection. For belted applications, contact Customer Service



# PowerWash™ XT Washdown Duty, Three Phase White Epoxy, Totally Enclosed, C-Face with Rigid Base

Inverter Duty

**Applications:** Gear reducers, pumps, fans, blowers, conveyors and other other machinery found in food processing, dairies, slaughter houses, beverage plants, car washes, and other high humidity or wet environments or where motor is subject to high pressure washdowns.



- Features:**
- 10:1 Variable torque, Constant Torque speed range as listed below
  - MAX GUARD® Class F insulation system
  - 1.15 Service Factor on sinewave, 1.0 Service Factor on IGBT power
  - Double sealed ball bearings
  - 303 stainless steel shaft with spring loaded contact seals in each endshield (drive end only on TENV)
  - Stainless steel fan guard (TEFC only)
  - Cast conduit box with threaded openings, stainless steel cover
  - Plugged drain holes in each endshield for all angle mounting
  - Internal corrosion resistant coatings on frame, base, endshields, rotor, and stator.
  - USDA-approved, white epoxy RUST-OLEUM paint
  - UL Recognized, CSA Certified and CE Marked
  - One year warranty



C-Face with Rigid Base

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	CT SPEED RANGE†	NOM. EFF.	F.L. AMPS	WGHT. LBS.	“C” DIM.	FOOT NOTES
1/4	1800	208-230/460	56C	N564★	56T17V5332	\$410	F3	1000:1	68.0	1.1-1.1/.55	24	10.08	N
	1800	575	56C	N620★	56T17W5333	\$410	F3	10:1	68.0	0.44	20	10.69	d,V
1/3	1800	208-230/460	56C	N565	56T17V5334	\$434	F3	1000:1	72.0	1.3-1.3/.65	23	10.08	N
	1800	208-230/460	56C	N628★	56T17W5334	\$450	F3	1000:1	68.0	1.7-1.7/8.5	23	10.69	
	1800	575	56C	N621	56T17W5335	\$450	F3	10:1	68.0	0.68	20	10.69	V
1/2	3600	208-230/460	56C	N566★	56T34V5305	\$409	F3	1000:1	76.0	1.7-1.6/0.8	30	10.58	N
	1800	208-230/460	56C	N567★	56T17V5336	\$458	F3	1000:1	78.5	1.8-1.8/0.9	26	10.58	N
	1800	575	56C	N622★	56T17V5337	\$458	F3	1000:1	78.5	0.80	25	10.08	N
	1200	208-230/460	56C	N568★	56T11V5376	\$572	F3	1000:1	77.0	2.3-2.3/1.5	23	11.58	N
3/4	3600	208-230/460	56C	N569★	56T34V5306	\$449	F3	1000:1	75.5	2.6-2.4/1.2	24	11.08	N
	1800	208-230/460	56C	N599★	56T17V5338	\$530	F3	1000:1	80.0	2.5-2.5/1.25	33	10.58	N
	1800	575	56C	N623	56T17W5339	\$530	F3	10:1	77.0	1.12	27	11.19	V
	1200	208-230/460	56C	N600	56T11V5377	\$622	F3	1000:1	78.5	3.0-3.0/1.5	25	13.06	N,5
1	3600	208-230/460	56C	N601★	56T34V5307	\$525	F3	1000:1	78.5	2.8-2.6/1.3	39	11.56	N
	1800	208-230/460	56C	N602★	56T17V5340	\$553	F3	1000:1	80.0	3.2-3.2/1.6	36	11.58	N
	1800	575	56C	N627	56T17W5341	\$553	F3	10:1	80.0	1.3	30	11.58	V
	1800	208-230/460	143TC	N626★	145TTWR4028	\$553	F3	10:1	82.5	3.2-3.1/1.55	38	13.25	V
	1200	208-230/460	56HC	N604★	56T11W5377	\$667	F3	10:1	78.5	4.0-4.0/2.0	26	13.06	5,V
1 1/2	3600	208-230/460	56C	N605★	56T34V5308	\$580	F3	1000:1	80.0	4.2-3.8/1.9	47	12.56	N
	1800	208-230/460	56C	N606★	56T17V5342	\$577	F3	1000:1	84.0	4.2-4.2/2.1	34	13.06	N
	1800	208-230/460	145TC	N607★	145TTVR5326	\$577	F3	1000:1	84.0	4.2/2.1	48	13.12	N
	1200	208-230/460	56HC	N608★	56T11W5378	\$704	F3	10:1	77.0	5.7/2.85	31	14.18	5,V
2	3600	208-230/460	56HC	N609★	56T34V5309	\$644	F3	NA	82.5	5.6-5.0/2.5	48	13.06	N, 5,17
	3600	208-230/460	145TC	N610★	145TTVR5302	\$714	F3	1000:1	82.5	5.0-5.0/2.5	47	13.25	N
	1800	208-230/460	56C	N611★	56T17W5327	\$662	F3	10:1	81.5	6.2-6.2/3.1	39	12.69	V
	1800	208-230/460	145TC	N612★	145TTWR4026	\$714	F3	10:1	84.0	6.0-5.6/2.8	50	13.75	V

★ Stock Model † Requires nameplate modification

Continued on next page.

INVERTER DUTY WASHDOWN

**Footnotes:**

- d To be discontinued after current stock is gone
- N Totally Enclosed, Non-Ventilated
- V Suitable for 10:1 CT 60 minute duty, otherwise 2:1 CT

- 5 56H, 143T, and 145T combination base with 12 mounting holes
- 17 1.0 Service Factor

# PowerWash™ XT Washdown Duty, Three Phase White Epoxy, Totally Enclosed

## C-Face with Rigid Base

Continued from page 79

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	CT SPEED RANGE†	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES
<b>3</b>	3600	208-230/460	145TC	<b>N613</b> *	145TTWR4001	\$842	F3	10:1	85.5	7.4-7.4/3.7	46	12.62	V
	1800	208-230/460	182TC	<b>N614</b> *	182TTWR4026	\$714	F3	10:1	87.5	8.2-8.2/4.1	77	14.47	V
<b>5</b>	3600	208-230/460	184TC	<b>N615</b> *	184TTWR4001	\$1,175	F3	10:1	87.5	12.8-12.0/6.0	84	14.47	V
	1800	208-230/460	184TC	<b>N616</b> *	184TTWR4026	\$1,061	F3	10:1	87.5	13.8-13.0/6.5	90	14.97	V
<b>7 1/2</b>	3600	208-230/460	213TC	<b>N617</b>	213TTWR4002	\$1,459	F3	10:1	88.5	17.6-16.8/8.4	120	17.47	V
	1800	208-230/460	213TC	<b>N618</b> *	213TTWR4026	\$1,345	F3	10:1	89.5	24.0-22.0/11.0	145	17.71	V
<b>10</b>	1800	208-230/460	215TC	<b>N619</b> *	215TTWR4026	\$1,529	F3	10:1	89.5	29.0-28.0/14.0	145	18.71	V

\* Stock Model

† Requires nameplate modification

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPCa and/or NRCa Canadian standards.

## C-Face

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	CT SPEED RANGE†	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES
<b>1/4</b>	1800	208-230/460	56C	N640*	56T17V5326	\$408	F3	1000:1	68.0	1.1-1.1/55	50	9.56	N
<b>1/3</b>	1800	208-230/460	56C	N641*	56T17V5327	\$433	F3	1000:1	72.0	1.3-1.3/65	22	9.56	N
<b>1/2</b>	1800	208-230/460	56C	N642*	56T17V5328	\$447	F3	1000:1	78.5	1.8-1.8/9	26	10.06	N
<b>3/4</b>	3600	208-230/460	56C	N643*	56T34V5301	\$451	F3	1000:1	75.5	2.6-2.4/1.2	50	10.06	N
	1800	208-230/460	56C	N644*	56T17V5329	\$517	F3	1000:1	80.0	2.5-2.5/1.25	28	10.56	N
<b>1</b>	3600	208-230/460	56C	N645*	56T34V5302	\$527	F3	1000:1	78.5	2.8-2.3/1.3	60	11.56	N
	1800	208-230/460	56C	N646*	56T17V5330	\$539	F3	1000:1	80.0	3.2-3.2/1.6	50	11.56	N
	1800	208-230/460	143TC	N647*	143TTVR5326	\$539	F3	1000:1	80.0	3.2-3.2/1.6	38	11.75	N
<b>1 1/2</b>	3600	208-230/460	56C	N648	56T34V5303	\$558	F3	1000:1	80.0	4.2-3.8/1.9	43	12.56	N
	1800	208-230/460	56C	N649*	56T17V5331	\$562	F3	1000:1	84.0	4.2-4.2/2.1	35	13.06	N
	1800	208-230/460	143TC	N650*	143TTVR5327	\$562	F3	1000:1	84.0	4.2-4.2/2.1	50	13.25	N
<b>2</b>	3600	208-230/460	56C	N651*	56T34V5304	\$639	F3	1000:1	82.5	5.6-5.0/2.5	34	13.06	N
	3600	208-230/460	145TC	N652*	145TTVR5301	\$639	F3	1000:1	82.5	5.6-5.0/2.5	42	13.25	d,N
	1800	208-230/460	56C	N653*	56T17V5326	\$655	F3	10:1	81.5	6.2-6.2/3.1	39	12.69	V
	1800	208-230/460	145TC	N654*	145TTWR5326	\$655	F3	10:1	81.5	6.2-6.2/3.1	42	12.75	V
<b>3</b>	3600	208-230/460	145TC	N655*	145TTWR5301	\$780	F3	10:1	80.0	8.4-7.6/3.8	36	13.25	V
	1800	208-230/460	182TC	N656*	182TTWR7026	\$858	F3	10:1	82.5	9.0-9.0/4.5	64	14.47	V
<b>5</b>	3600	208-230/460	184TC	N657*	184TTWR7001	\$1,088	F3	10:1	85.5	13.6-12.4/6.2	90	14.47	V
	1800	208-230/460	184TC	N658*	184TTWR7026	\$972	F3	10:1	82.5	13.2-14.0/6.6	76	14.47	V
<b>7 1/2</b>	3600	208-230/460	213TC	N659	213TTWR7001	\$1,349	F3	10:1	86.5	19.6-18.4/9.2	85	15.47	V
	1800	208-230/460	213TC	N660*	213TTWR7026	\$1,235	F3	10:1	89.5	24.0-22.0/11.0	175	17.71	V
<b>10</b>	1800	208-230/460	215TC	N661*	215TTWR7026	\$1,402	F3	10:1	89.5	29.0-28.0/14.0	150	18.71	V

\* Stock Model

† Requires nameplate modification

### Footnotes:

d To be discontinued after current stock is gone

N Totally Enclosed, Non-Ventilated

V Suitable for 10:1 CT 60 minute duty, otherwise 2:1 CT

# PowerWash™ SXT Washdown Duty, Three Phase

## All Stainless Steel, Totally Enclosed

### Inverter Duty

**Applications:** For use in pharmaceutical and food processing industries where maximum sanitation requirements are specified. Suitable for use in severe chemical processing industries where nitric acid and caustic lye may be present.

- Features:**
- Suitable for use on VFD 10:1 Variable torque, 10:1(TEFC) or 1000:1(TENV) Constant torque.
  - MAX GUARD® Class F insulation system
  - 1.15 Service Factor on sinewave, 1.0 Service Factor on IGBT power
  - Double sealed ball bearings
  - 303 stainless steel shaft with spring loaded contact seals in each endshield (drive end only on TENV)
  - 300 series stainless steel external construction: frame, endshields, conduit box, box cover, base, and hardware
  - 100% Paint-free construction
  - One way condensation drains in each endshield and conduit box for all-angle mounting
  - Internal corrosion resistant coatings on frame, base, endshields, rotor, and stator.
  - Nitrile Buna-N gaskets and seals on conduit box, through-bolts and endshields
  - Rated 60/50 hertz, 190/380 volt at next lower horsepower
  - UL Recognized, CSA Certified and CE Marked



**IP55**

### C-Face with Rigid Base

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES
<b>1/3</b>	3600	208-230/460	56C	N450 ★	56T34VD5301	<b>\$431</b>	F3	74.0	1.1-1.0/5	20	9.40	DS,N,d
	1800	208-230/460	56C	N410 ★	56T17VD5326	<b>\$482</b>	F3	78.5	1.2-1.3/65	30	9.40	DS,N
<b>1/2</b>	3600	208-230/460	56C	N451 ★	56T34VD5302	<b>\$441</b>	F3	77.0	1.6-1.5/75	25	9.40	DS,N
	1800	208-230/460	56C	N411 ★	56T17VD5328	<b>\$496</b>	F3	81.5	1.5-1.6/8	34	9.40	DS,N
<b>3/4</b>	3600	208-230/460	56C	N452 ★	56T34VD5303	<b>\$484</b>	F3	78.5	2.2-2.0/1.0	25	9.40	DS,N
	1800	208-230/460	56C	N412 ★	56T17VD5327	<b>\$573</b>	F3	82.5	2.4-2.3/1.3	40	12.06	DS,N
<b>1</b>	3600	208-230/460	56HC	N453 ★	56T34WD5301	<b>\$569</b>	F3	80.0	2.9-2.6/1.3	25	13.40	DS,5
	3600	208-230/460	143TC	<b>N454</b> ★	143TTWD4001	<b>\$611</b>	F3	80.0	2.9-2.6/1.3	20	13.87	DS
	1800	208-230/460	56HC	N413 ★	56T17WD5326	<b>\$597</b>	F3	82.5	3.2-3.0/1.5	40	12.13	DS,5
	1800	208-230/460	143TC	<b>N414</b> ★	143TTWD4026	<b>\$642</b>	F3	82.5	3.2-3.0/1.5	41	13.69	DS
<b>1 1/2</b>	3600	208-230/460	56HC	N455 ★	56T34WD5302	<b>\$627</b>	F3	82.5	4.2-3.8/1.9	25	13.40	DS,5
	3600	208-230/460	143TC	<b>N456</b> ★	143TTWD4002	<b>\$675</b>	F3	82.5	4.2-3.8/1.9	20	13.87	DS
	1800	208-230/460	56HC	N415 ★	56T17WD5329	<b>\$623</b>	F3	84.0	5.0-4.8/2.4	40	14.25	DS,5
<b>2</b>	3600	208-230/460	56HC	N457 ★	56T34WD5303	<b>\$695</b>	F3	84.0	5.6-5.0/2.5	20	13.40	DS,5
	3600	208-230/460	145TC	<b>N458</b> ★	145TTWD4001	<b>\$809</b>	F3	84.0	5.6-5.0/2.5	47	13.87	DS
	1800	208-230/460	56HC	N417 ★	56T17WD5328	<b>\$711</b>	F3	84.0	6.2-5.8/2.9	46	14.25	DS,5
	1800	208-230/460	145TC	<b>N418</b> ★	145TTWD4029	<b>\$793</b>	F3	84.0	6.2-5.8/2.9	49	13.69	DS

★ Stock Model

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPAAct and/or NRCAN Canadian standards.

INVERTER DUTY WASHDOWN

### C-Face

HP	RPM	VOLTS	FRAME	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES
<b>1/3</b>	1800	208-230/460	56C	N430 ★	56T17VD5329	<b>\$479</b>	F3	78.5	1.2-1.3/65	30	9.40	DS,N
<b>1/2</b>	1800	208-230/460	56C	N431 ★	56T17VD5330	<b>\$491</b>	F3	81.5	1.5-1.6/1.6	32	9.40	DS,N
<b>3/4</b>	1800	208-230/460	56C	N432 ★	56T17VD5331	<b>\$571</b>	F3	82.5	2.4-2.3/1.15	30	9.40	DS,N
<b>1</b>	1800	208-230/460	56C	N433 ★	56T17WD5330	<b>\$491</b>	F3	82.5	3.2-3/1.5	39	13.40	DS
	1800	208-230/460	143TC	N434 ★	143TTWD5527	<b>\$573</b>	F3	82.5	3.2-3/1.5	40	13.87	DS
<b>1 1/2</b>	1800	208-230/460	56C	N435 ★	56T17WD5331	<b>\$571</b>	F3	84.0	5.8-5.4/4.4	42	13.40	DS
<b>2</b>	1800	208-230/460	56C	N437 ★	56T17WD5332	<b>\$709</b>	F3	84.0	6.2-5.8/2.9	49	13.40	DS
	1800	208-230/460	145TC	<b>N438</b> ★	145TTWD5528	<b>\$729</b>	F3	84.0	6.2-5.8/2.9	50	13.87	DS

★ Stock Model

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPAAct and/or NRCAN Canadian standards.

**Footnotes:**

DS Sourced  
N Totally Enclosed, Non-Ventilated

- 5 56H, 143T, and 145T combination base with 12 mounting holes
- d To be discontinued after current stock is gone

# Brakemotors

## Totally Enclosed, C-Face with Rigid Base and C-Face with Removable Rigid Base

### Inverter Duty



**Applications:** Used in conveyors, machine tools, door operators, speed reducers, cranes, hoists, and other industrial machinery requiring quick stop and/or holding torque. May be used in damp, dirty or dusty environments.

- Features:**
- 10:1 Variable torque, Constant torque speed range as listed below
  - CR200 Corona Resistant, 200° C rated magnet wire
  - 1.15 Service Factor on sinewave (except where noted), 1.0 Service Factor on IGBT power
  - Fail-safe, spring set brake for holding or stopping
  - Brake has manual wear adjustment up to 25 lb-ft. for longer pad life
  - Manual release lever on rear of brake housing
  - Vertical or horizontal mounting (10 lb-ft. and smaller)
  - For vertical mounting on 15 lb-ft and larger use kit #A157
  - Brake leads routed through motor conduit box (TENV only)
  - Ball bearings, mechanically locked on shaft end
  - Bolt-on, removable rigid base where noted
  - Nameplated 60/50 hertz, 190/380 volt at next lower horsepower
  - UL Recognized and CSA Certified
  - One year warranty

HP	RPM	VOLTS	NEMA FRAME	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	CT SPEED RANGE†	F.L. AMPS	BRAKE RATING	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES
<b>1/3</b>	1800	208-230/460	56C	D450★	56T17F5348	\$561	E5	10:1	1.8-1.6/0.8	3	27	15.73	6
	1200	208-230/460	56C	D451	56T11F5325	\$561	E5	10:1	1.9-2.2/1.1	3	30	15.73	6
<b>1/2</b>	1800	208-230/460	56C	D452★	56T17F5349	\$631	E5	10:1	2.3-2.4/1.2	3	30	16.23	6
	1200	208-230/460	56C	D453★	56T11F5326	\$927	E5	10:1	2.4-2.7/1.4	6	33	16.23	6
<b>3/4</b>	1800	208-230/460	56C	D454★	56T17F5350	\$741	E5	10:1	2.9-3.0/1.5	6	33	16.23	6
	1200	208-230/460	56C	D455★	56T11F5327	\$1,089	E5	4:1	3.1-3.2/1.6	6	37	16.73	6
<b>1</b>	1800	208-230/460	56C	D456★	56T17F5357	\$800	E5	10:1	3.5-3.6/1.8	6	35	16.73	6
	1200	208-230/460	145TC	C400	145TTFR5382	\$1,167	E5	4:1	3.95-4.0/2.0	10	48	17.26	6,d
<b>1 1/2</b>	1800	208-230/460	56C	D457★	56T17F5358	\$977	E5	2:1	4.8-4.8/2.4	10	32	17.26	6
	1800	208-230/460	145TC	C401★	145TTFR5360	\$977	E5	2:1	4.8-4.8/2.4	10	39	16.76	6
	1200	208-230/460	56C	C402	184TTTL7084	\$1,301	E5	1000:1	5.55-5.2/2.6	15	130	19.23	AL,F,N,82
<b>2</b>	1800	208-230/460	145TC	C403★	145TTFR5359	\$1,026	E5	4:1	6.0-5.8/2.9	10	49	18.77	6
	1200	208-230/460	186TC	C404	184TTTL7083	\$1,358	E5	1000:1	6.8-6.6/3.3	15	90	19.23	AL,F,N,82
<b>3</b>	1800	230/460	182TC	C405★	182TTTL7034	\$1,358	E5	1000:1	8.0/4.0	15	102	19.68	AL,F,N,82
<b>5</b>	1800	208-230/460	184TC	C406★	184TTTL7041	\$1,836	E5	1000:1	13.8-12.4/6.2	25	120	20.23	AL,F,N,17,82
<b>7 1/2</b>	1800	230/460	213TC	C407★	213TTTL7034	\$2,411	E5	1000:1	19.2/9.6	35	186	26.14	AL,F,N,17,82
<b>10</b>	1800	230/460	215TC	C408★	215TTTL7050	\$3,014	E5	1000:1	25.0/12.5	50	227	28.64	AL,F,N,17,82

★ Stock Model

† Requires nameplate modification

### Mult Sym S4

CAT. NO.	MODEL NO.	LIST KIT ONLY	LIST INSTALLED
A157	KIT VRT87BRK	\$375	\$493

### Brake Data - Stock Motors

Nominal Static Torque	Coil Size	Voltage				Stearns Series	Optional Space Heater Watts	
			115	230	460			
<b>1.5</b> <b>3</b>	4	Inrush	3.6	1.8	0.9	56,000	115V	30
		Holding	0.3	0.2	0.08			
<b>6</b> <b>10</b>	K4	Inrush	4.3	2.2	1.1		230V	30
		Holding	0.3	0.2	0.08			
<b>15</b> <b>25</b> <b>50</b>	6	Inrush	13	6.5	3.2	87,000	115V	30
		Holding	0.6	0.3	0.2			
<b>35</b> <b>75</b> <b>105</b>	8	Inrush	17.6	8.8	4.2		230V	30
		Holding	1.2	0.6	0.3			

See Brake selection and pricing page for "Buildup" Brakemotors

#### Footnotes:

- AL Aluminum Frame construction
- F Class F insulation
- N Totally Enclosed, Non-Ventilated
- 6 Bolt-on, removable base for footless mounting option
- 17 1.0 Service Factor
- 82 Welded (non-removable) base
- d To be discontinued after current stock is gone

# Blue Chip® Severe Duty Explosion Proof Class I Group D (Group C as noted), Class II Groups F & G, Rigid Base

**Inverter Duty**

**Applications:** For use on fans, blowers, pumps, compressors, machine tools, and other equipment installed in hazardous environments as defined by the motor's explosion proof class and group rating. Refer to the General Information section for information regarding explosion proof classifications. Consult the National Electrical Code and your local regulations for the proper selection of motors in hazardous locations.



- Features:**
- 10:1 Variable torque, Constant torque speed range as listed below (consult factory for possible upgrade from 2:1 to 10:1 CT)
  - Class F insulation
  - CR<sup>200</sup> Corona Resistant, 200° C rated magnet wire
  - 1.15 Service Factor on sinewave, 1.0 Service Factor on IGBT power
  - Ball bearings (roller bearings, as noted)
  - All cast iron construction as noted
  - Normally closed thermostats (must be connected to control circuit)
  - Shaft slinger
  - External surface treated with epoxy paint
  - Meets UL Frame temperature limit code T3B
  - Rated 60/50 hertz, 190/380 or 380 volt, at next lower horsepower (575 volt excluded)
  - C-Face modification available (254T-445T Frames)
  - Meets IEEE45 USCG Marine Duty, IP54 construction
  - UL Listed file no. E12044 and CSA Certified file no. LR21839 and LR47504
  - Two year warranty



INVERTER DUTY EXPLOSION PROOF

HP	RPM	VOLTS	FRAME	GROUP C	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	CT SPEED RANGE	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES
<b>1</b>	1800	208-230/460	143T	N	<b>U001</b> *	143TTGN4026	<b>\$643</b>	E7	10:1	82.5	3.0-3.0/1.5	62	13.48	25,80,91
	1800	575	143T	N	<b>U020</b> *	143TTGN4030	<b>\$643</b>	E7	10:1	82.5	1.2	62	13.48	25,80
	1200	208-230/460	145T	N	<b>U039</b> *	145TTGN4076	<b>\$775</b>	E7	10:1	80.0	3.6-3.4/1.7	69	14.73	25,80,91
<b>1 1/2</b>	3600	208-230/460	143T	N	<b>U058</b> *	143TTGN4001	<b>\$689</b>	E7	10:1	82.5	4.4-4.0/2.0	64	13.48	25,80,91
	1800	208-230/460	145T	N	<b>U002</b> *	145TTGN4026	<b>\$686</b>	E7	10:1	84.0	4.6-4.4/2.2	74	14.73	25,80,91
	1800	575	145T	N	<b>U021</b> *	145TTGN4035	<b>\$686</b>	E7	10:1	84.0	1.8	75	14.73	25,80
	1200	208-230/460	182T	N	<b>U040</b> *	182TTGS4076	<b>\$808</b>	E7	10:1	85.5	5.0-5.0/2.5	138	17.44	25,91
<b>2</b>	3600	208-230/460	145T	N	<b>U059</b> *	145TTGN4001	<b>\$808</b>	E7	10:1	84.0	5.6-5.2/2.6	63	13.48	25,80,91
	1800	208-230/460	145T	N	<b>U003</b> *	145TTGN4027	<b>\$726</b>	E7	10:1	85.5	6.2-6.0/3.0	76	14.73	25,80,91
	1800	575	145T	N	<b>U022</b> *	145TTGN4040	<b>\$726</b>	E7	10:1	85.5	2.4	77	14.73	25,80
	1200	208-230/460	184T	N	<b>U041</b> *	184TTGS4076	<b>\$914</b>	E7	10:1	86.5	6.4-6.0/3.0	130	17.44	25,91
<b>3</b>	3600	208-230/460	182T	N	<b>U060</b> *	182TTGS4001	<b>\$836</b>	E7	10:1	85.5	8.4-7.4/3.7	150	16.19	25,91
	1800	208-230/460	182T	N	<b>U004</b> *	182TTGS4026	<b>\$828</b>	E7	10:1	87.5	8.8-8.4/4.2	134	16.19	25,91
	1800	575	182T	N	<b>U023</b> *	182TTGS4030	<b>\$828</b>	E7	10:1	87.5	3.4	130	16.19	25
	1200	230/460	213T	N	<b>U042</b> *	213TTGS4076	<b>\$1,171</b>	E7	10:1	87.5	8.8/4.4	213	19.66	25
<b>5</b>	3600	208-230/460	184T	N	<b>U061</b> *	184TTGS4001	<b>\$1,016</b>	E7	10:1	87.5	13.0-12.4/6.2	146	17.44	25,91
	1800	208-230/460	184T	N	<b>U005</b> *	184TTGS4026	<b>\$908</b>	E7	10:1	86.5	14.0-13.0/6.5	127	17.44	25,91
	1800	575	184T	N	<b>U024</b> *	184TTGS4030	<b>\$908</b>	E7	10:1	86.5	5.2	142	17.44	25
	1200	230/460	215T	N	<b>U043</b> *	215TTGS4076	<b>\$1,501</b>	E7	10:1	87.5	14.0/7.0	187	20.91	25
<b>7 1/2</b>	3600	208-230/460	213T	N	<b>U062</b> *	213TTGS4001	<b>\$1,295</b>	E7	10:1	88.5	20-19/9.5	230	20.91	25,91
	1800	208-230/460	213T	N	<b>U006</b> *	213TTGS4026	<b>\$1,229</b>	E7	10:1	89.5	22.0-20.0/10.0	202	19.66	25,91
	1800	575	213T	N	<b>U025</b> *	213TTGS4030	<b>\$1,229</b>	E7	10:1	89.5	8.0	194	19.66	25
	1200	230/460	254T	Y	<b>U044</b> *	254TTGN4076	<b>\$1,958</b>	E7	10:1	89.5	20.0/10.0	390	23.52	
<b>10</b>	3600	230/460	215T	Y	<b>U063</b> *	215TTGS4001	<b>\$1,470</b>	E7	10:1	89.5	24.0/12.0	248	20.91	25
	1800	208-230/460	215T	N	<b>U007</b> *	215TTGS4026	<b>\$1,433</b>	E7	2:1	89.5	28.1-25.0/12.5	227	20.91	25,91
	1800	575	215T	N	<b>U026</b> *	215TTGS4030	<b>\$1,433</b>	E7	2:1	89.5	10.0	227	20.91	25
	1200	230/460	256T	Y	<b>U045</b> *	256TTGN4076	<b>\$2,362</b>	E7	10:1	89.5	26.0/13.0	400	25.27	
<b>15</b>	3600	230/460	254T	Y	<b>U064</b> *	254TTGP4001	<b>\$1,914</b>	E7	10:1	90.2	36.0/18.0	252	23.69	
	1800	208-230/460	254T	Y	<b>U008</b> *	254TTGN4026	<b>\$1,836</b>	E7	10:1	91.0	42.0-39.0/19.5	292	23.52	91
	1800	575	254T	Y	<b>U027</b> *	254TTGN4030	<b>\$1,836</b>	E7	10:1	91.0	15.6	365	23.52	
	1200	208-230/460	284T	Y	<b>U046</b> *	284TTGN4076	<b>\$3,280</b>	E7	10:1	90.2	43.0-40.0/20.0	525	26.34	91

Blue shaded areas are Cast Iron Frames

★ Stock Model

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

**Footnotes:**

- 25 Motor will not accept C-face kits
- 80 Rolled steel fan guard
- 91 Suitable for use on VFD, 230/460 V only

# Blue Chip® Severe Duty Explosion Proof Class I Group D (Group C as noted), Class II Groups F & G, Rigid Base

## Inverter Duty

INVERTER DUTY EXPLOSION PROOF

HP	RPM	VOLTS	FRAME	GROUP C	CAT. NO.	MODEL NO.	LIST PRICE	MULT. SYMB.	CT SPEED RANGE	NOM. EFF.	F.L. AMPS	APPROX. WGT. LBS.	"C" DIM.	FOOT NOTES
<b>20</b>	3600	208-230/460	256T	Y	<b>U065</b> *	256TTGN4001	\$2,412	E7	10:1	90.2	52.0-47.0/23.5	310	25.27	91
	1800	208-230/460	256T	Y	<b>U009</b> *	256TTGN4026	\$2,197	E7	2:1	91.0	53.9-50.0/25.0	376	25.27	91
	1800	575	256T	Y	<b>U028</b> *	256TTGN4030	\$2,197	E7	2:1	91.0	20.0	300	25.27	
	1200	230/460	286T	Y	<b>U047</b> *	286TTGN4076	\$3,825	E7	10:1	90.2	54.0/27.0	545	27.84	
<b>25</b>	3600	230/460	284TS	Y	<b>U066</b> *	284TSTGP4001	\$3,113	E7	10:1	91.0	60.0/30.0	547	24.89	
	1800	208-230/460	284T	Y	<b>U010</b> *	284TTGP4026	\$2,795	E7	2:1	92.4	68.0-63.0/31.5	456	26.26	91
	1200	230/460	324T	Y	<b>U048</b> *	324TTGP4076	\$4,833	E7	10:1	91.7	67.0/33.5	700	28.97	
<b>30</b>	3600	230/460	286TS	Y	<b>U067</b> *	286TSTGP4001	\$3,355	E7	2:1	91.0	72.0/36.0	494	26.39	
	1800	208-230/460	286T	Y	<b>U011</b> *	286TTGP4026	\$3,241	E7	2:1	92.4	81.0-74.0/37.0	519	27.76	91
	1200	230/460	326T	Y	<b>U049</b> *	326TTGS4076	\$5,655	E7	10:1	91.7	82.0/40.5	700	30.47	
<b>40</b>	3600	230/460	324TS	Y	<b>U068</b> *	324TSTGP4001	\$4,517	E7	2:1	91.7	95.0/47.5	584	27.47	
	1800	230/460	324T	Y	<b>U012</b> *	324TTGP4026	\$4,315	E7	2:1	93.0	100/50.0	650	28.97	
	1200	230/460	364T	Y	<b>U050</b> *	364TTGS4086	\$7,357	E7	10:1	93.0	103/51.5	960	31.50	
<b>50</b>	3600	230/460	326TS	Y	<b>U069</b> *	326TSTGP4001	\$5,837	E7	2:1	92.4	115/57.5	700	28.97	
	1800	230/460	326T	Y	<b>U013</b> *	326TTGP4026	\$5,253	E7	2:1	93.0	122/61.0	678	30.47	
	1200	230/460	365T	Y	<b>U092</b> *	365TTGS4091	\$8,342	E7	2:1	93.0	127/63.5	1122	32.50	
<b>60</b>	3600	230/460	364TS	Y	<b>U070</b> *	364TSTGS4001	\$8,342	E7	2:1	93.0	142/71.0	971	29.38	
	1800	230/460	364T	Y	<b>U093</b> *	364TTGS4046	\$7,632	E7	2:1	93.6	144/72.0	1000	31.50	
	1200	230/460	404T	Y	<b>U089</b> *	404TTGS4087	\$9,944	E7	2:1	93.6	144/72.0	1324	35.62	
<b>75</b>	3600	230/460	365TS	Y	<b>U071</b> *	365TSTGS4001	\$9,641	E7	2:1	93.0	171/85.5	950	30.38	
	1800	230/460	365T	Y	<b>U094</b> *	365TTGS4046	\$9,390	E7	2:1	94.1	178/89.0	1138	32.50	
	1200	230/460	405T	Y	<b>U088</b> *	405TTGS4087	\$11,565	E7	2:1	93.6	185/92.5	1398	37.12	
<b>100</b>	3600	230/460	405TS	Y	<b>U096</b>	405TSTGS4003	\$13,042	E7	2:1	94.1	224/112	1263	34.12	
	1800	230/460	405T	Y	<b>U097</b> *	405TTGS4046	\$11,546	E7	2:1	94.5	228/114	1355	37.12	
	1200	230/460	444T	Y	<b>U095</b> *	444TTGS4087	\$16,074	E7	2:1	94.1	238/119	1839	41.25	
<b>125</b>	3600	460	444TS	Y	<b>U073</b> *	444TSTGS4003	\$18,003	E7	2:1	94.5	137	1779	37.50	
	1800	460	444T	Y	<b>U085</b> *	444TTGS4038	\$14,912	E7	2:1	94.5	142	1835	41.25	
<b>150</b>	3600	460	445TS	Y	<b>U074</b>	445TSTGN4001	\$21,073	E7	2:1	95.0	167	2212	39.44	
	1800	460	445T	Y	<b>U018</b> *	445TTGN4037	\$17,628	E7	10:1	95.0	172	2500	43.19	
<b>200</b>	3600	460	445TS	Y	<b>U075</b>	445TSTGN4005	\$25,713	E7	2:1	95.0	222	2395	39.44	
	1800	460	445T	Y	<b>U019</b> *	445TTGN4053	\$20,837	E7	2:1	95.0	225	2377	43.19	RB

Blue shaded areas are Cast Iron Frames

★ Stock Model

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

**Footnotes:**

- RB Roller Bearing on Drive End, suitable for belted loads only
- 17 1.0 Service Factor
- 91 Suitable for use on VFD, 230/460 V only

# Globetrotter® IEC (Metric) Frame, Three Phase

## Totally Enclosed, B3 Mounting, Rigid Base

**Applications:** For use on fans, pumps, compressors, conveyors, and other equipment requiring IEC dimensions and electrical standards. The Globetrotter is not only designed to International standards but meets NEMA performance and efficiency standards making it suitable for requirements worldwide.

- Features:**
- Aluminum (63-90 frame) or Cast Iron (100-250 frame) frame construction
  - Nameplated 60/50 hertz at same HP/KW
  - Max Guard® Class F Insulation, Class B rise @ rated KW
  - IP55 weatherproof enclosure
  - Rotatable/Removable Base (63/90 frame)
  - Wye Start-Delta Run on 160 Frame and larger
  - 10:1 Variable Torque, Constant Torque speed range as noted
  - Meets EFF2 European, EPAct and NRCAN Canadian efficiencies, as noted
  - Top Mounted/Oversized gasketed terminal box
  - Meets IEEE45, IEC60092 & USCG CFR46 Marine Duty (63-90 frame "Below Deck")
  - 1.15 Service factor on 60 Hz sine wave, 1.0 SF or VFD
  - IEC Design "N" with NEMA "B" Torques
  - Terminal Blocks, Stud Type, Zero Creepage
  - Kits or MOD Central for B3/B5 or B3/B14 mounting
  - Meets IEC 34 electrical standards
  - Meets IEC 72 dimensions and tolerances
  - CE Marked
  - 1 Year Warranty



INVERTER DUTY IEC (Metric)

**CONSULT  
MARATHON ELECTRIC  
FOR SPECIAL IEC  
MOTORS**

Multiplier Symbol F4

HP/ KW	RPM 60/50 HZ	60 HZ VOLTS	50 HZ VOLTS	IEC FRAME	CAT. NO.	MODEL NO.	CT SPEED RANGE†	LIST PRICE	NOM. EFF.	60 HZ F.L. AMPS	APPROX. WGHT. LBS.	IEC "L" DIM. (MM)	FOOT NOTES	B5/FF FLANGE
<b>1/4-0.18</b>	3600/3000	230/460	200/400	63	R300★	63T34FH5301	20:1	\$175	72.0	0.8/0.4	11	217	DS	A569
	3600/3000	575	480	63	R400★	63T34FH5303	20:1	\$175	72.0	0.3	11	217	DS,d	A569
	1800/1500	230/460	200/400	63	R301★	63T17FH5326	20:1	\$182	68.0	1.0/0.5	12	217	DS	A569
	1800/1500	575	480	63	R401★	63T17FH5327	20:1	\$182	68.0	0.4	12	217	DS	A569
	1200/1000	230/460	200/400	71	R302★	71T11FH5376	20:1	\$311	64.0	1.2/0.6	13	240	DS	A570
<b>1/3-0.25</b>	3600/3000	230/460	200/400	63	R303★	63T34FH5302	20:1	\$201	72.0	1.1/55	12	217	DS	A569
	3600/3000	575	480	63	R403★	63T34FH5304	20:1	\$205	72.0	0.4	12	217	DS	A569
	1800/1500	230/460	200/400	71	R304★	71T17FH5326	20:1	\$213	68.0	1.4/7	14	240	DS	A570
	1800/1500	575	480	71	R404★	71T17FH5330	20:1	\$213	68.0	0.6	14	240	DS,d	A570
	1200/1000	230/460	200/400	80	R305★	80T11FH5376	20:1	\$334	70.0	1.3/65	20	282	DS	A571
<b>1/2-0.37</b>	3600/3000	230/460	200/400	71	R306★	71T34FH5301	20:1	\$218	74.0	1.6/8	14	240	DS	A570
	3600/3000	575	480	71	R406★	71T34FH5303	20:1	\$218	74.0	0.7	14	240	DS,d	A570
	1800/1500	230/460	200/400	71	R307★	71T17FH5327	20:1	\$222	74.0	1.8/9	15	240	DS	A570
	1800/1500	575	480	71	R407★	71T17FH5331	20:1	\$222	74.0	0.7	16	240	DS	A570
	1200/1000	230/460	200/400	80	R308★	80T11FH5377	20:1	\$348	72.0	1.9/95	22	282	DS	A571
<b>3/4-0.55</b>	3600/3000	230/460	200/400	71	R309★	71T34FH5302	20:1	\$229	74.0	2.4/1.2	16	240	DS	A570
	3600/3000	575	480	71	R409★	71T34FH5304	20:1	\$229	74.0	0.9	16	240	DS	A570
	1800/1500	230/460	200/400	80	R310★	80T17FH5326	20:1	\$241	74.0	2.5/1.25	21	282	DS	A571
	1800/1500	575	480	80	R410★	80T17FH5330	20:1	\$241	74.0	1.0	22	282	DS,d	A571
	1200/1000	230/460	200/400	80	R311★	80T11FH5378	20:1	\$374	72.0	2.7/1.35	25	282	DS	A571
<b>1-0.75</b>	3600/3000	230/460	200/400	80	R312★	80T34FH5301	20:1	\$260	75.5	2.8/1.4	24	282	DS	A571
	3600/3000	575	480	80	R412★	80T34FH5305	20:1	\$260	75.5	1.1	24	282	DS	A571
	1800/1500	230/460	200/400	80	R313★	80T17FH5327	20:1	\$264	80.0	3.2/1.6	29	282	DS	A571
	1800/1500	575	480	80	R413★	80T17FH5331	20:1	\$264	80.0	1.4	28	282	DS,d	A571
	1200/1000	230/460	200/400	90S	R314★	90ST11FH5376	20:1	\$389	80.0	3.3/1.7	33	326	DS	A572
<b>1 1/2-1.1</b>	3600/3000	230/460	200/400	80	R315★	80T34FH5302	20:1	\$287	84.0	4.0/2.0	30	282	DS	A571
	3600/3000	575	480	80	R415★	80T34FH5303	20:1	\$287	84.0	1.6	29	282	DS	A571
	1800/1500	230/460	200/400	90S	R316★	90ST17FH5326	20:1	\$295	85.5	4.6/2.3	40	326	DS	A572
	1800/1500	575	480	90S	R416★	90ST17FH5327	20:1	\$295	85.5	1.8	39	326	DS	A572
<b>2-1.5</b>	3600/3000	230/460	200/400	90S	R318★	90ST34FH5301	20:1	\$307	85.5	5.2/2.6	36	326	DS	A572
	3600/3000	575	480	90S	R418★	90ST34FH5302	20:1	\$307	85.5	2.1	36	326	DS	A572
	1800/1500	230/460	200/400	90L	R319★	90LT17FH5326	20:1	\$317	84.0	5.8/2.9	41	326	DS	A572
	1800/1500	575	480	90L	R419★	90LT17FH5327	20:1	\$317	84.0	2.4	39	326	DS	A572
	1200/1000	230/460	200/400	100L	R320★	100LTFC4576	2:1	\$495	86.5	7.6/3.8	82	380	DS	A573

Blue shaded areas are Cast Iron Frames

★ Stock Model † Requires nameplate modification Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPAct and/or NRCAN Canadian standards.

**Footnotes:**

d To be discontinued after current stock is gone  
DS Sourced

Continued on next page.

# Globetrotter® IEC (Metric) Frame, Three Phase

Totally Enclosed, B3 Mounting, Rigid Base

Multiplier Symbol F4

HP/ KW	RPM 60/50 HZ	60 HZ VOLTS	50 HZ VOLTS	IEC FRAME	CAT. NO.	MODEL NO.	CT SPEED RANGE†	LIST PRICE	NOM. EFF.	60 HZ F.L. AMPS	APPROX. WGHT. LBS.	IEC "L" DIM. (MM)	FOOT NOTES	B5/FF FLANGE
<b>3-2.2</b>	3600/3000	230/460	200/400	90L	<b>R321</b> ★	90LT34FH5301	20:1	\$442	86.5	7.2/3.6	42	326	DS	A572
	3600/3000	575	480	90L	<b>R421</b> ★	90LT34FH5302	20:1	\$442	86.5	2.9	42	326	DS,d	A572
	1800/1500	230/460	200/400	100L	<b>R322</b> ★	100LTFC4526	20:1	\$480	88.5	9.0/4.5	84	380	DS	A573
	1200/1000	230/460	200/400	112M	<b>R323</b> ★	112MTFC4576	20:1	\$699	87.5	9.0/4.5	100	400	DS	A573
<b>4-3</b>	3600/3000	230/460	200/400	100L	<b>R351</b> ★	100LTFC4501	20:1	\$512	87.5	9.2/4.6	71	380	DS	A573
	1800/1500	230/460	200/400	100L	<b>R352</b> ★	100LTFC4536	20:1	\$521	88.5	11.0/5.5	84	380	DS	A573
	1200/1000	230/460	200/400	132S	<b>R353</b> ★	132STFC4586	2:1	\$846	87.5	13/6.5	154	475	DS	A575
<b>5 1/2-4</b>	3600/3000	230/460	200/400	112M	<b>R324</b> ★	112MTFC4511	20:1	\$659	87.5	12.8/6.4	104	400	DS	A574
	1800/1500	230/460	200/400	112M	<b>R325</b> ★	112MTFC4536	20:1	\$635	87.5	14.0/7.0	104	400	DS	A574
	1200/1000	230/460	200/400	132M	<b>R326</b> ★	132MTFC4586	2:1	\$977	87.5	17/8.5	176	475	DS	A575
<b>7 1/2-5.5</b>	3600/3000	230/460	200/400	132S	<b>R327</b> ★	132STFC4501	20:1	\$826	90.2	17.6/8.8	152	475	DS	A575
	1800/1500	230/460	200/400	132S	<b>R328</b> ★	132STFC4526	20:1	\$826	90.2	19.6/9.8	150	475	DS	A575
	1200/1000	230/460	200/400	132M	<b>R329</b> ★	132MTFC4587	2:1	\$1,175	89.5	23.4/11.7	180	475	DS	A575
<b>10-7.5</b>	3600/3000	230/460	200/400	132S	<b>R330</b> ★	132STFC4502	20:1	\$884	89.5	23.2/11.6	163	475	DS	A575
	1800/1500	230/460	200/400	132M	<b>R331</b> ★	132MTFC4536	2:1	\$980	91.0	26/13	174	475	DS	A575
	1200/1000	230/460	200/400	160M	<b>R332</b> ★	160MTFC4586	2:1	\$1,524	89.5	28/14	251	600	YD,DS	A576
<b>15-11</b>	3600/3000	230/460	200/400	160M	<b>R333</b> ★	160MTFC4511	2:1	\$1,432	91.7	35.2/17.6	260	600	YD,DS	A576
	1800/1500	230/460	200/400	160M	<b>R334</b> ★	160MTFC4536	10:1	\$1,432	91.0	37.8/18.9	264	600	YD,DS	A576
	1200/1000	230/460	200/400	160L	<b>R335</b> ★	160LTFC4588	2:1	\$1,956	90.2	38.8/19.4	330	600	YD,DS	A576
<b>20-15</b>	3600/3000	230/460	200/400	160M	<b>R336</b> ★	160MTFC4512	10:1	\$1,680	91.7	46.8/23.4	269	600	YD,DS	A576
	1800/1500	230/460	200/400	160L	<b>R337</b> ★	160LTFC4538	2:1	\$1,771	91.0	47/23.5	311	600	YD,DS	A576
	1200/1000	230/460	200/400	180L	<b>R338</b> ★	180LTFC4588	2:1	\$2,743	90.2	54/27	385	710	YD,DS	A577
<b>25-18.5</b>	3600/3000	230/460	200/400	160L	<b>R339</b> ★	160LTFC4513	2:1	\$2,045	91.7	57.6/28.8	319	645	YD,DS	A576
	1800/1500	230/460	200/400	180M	<b>R340</b> ★	180MTFC4536	20:1	\$2,251	92.4	59.2/29.6	381	670	YD,DS	A577
	1200/1000	230/460	200/400	200L	<b>R341</b> ★	200LTFC4588	2:1	\$3,440	91.7	63/31.5	467	775	YD,DS	A578
<b>30-22</b>	3600/3000	230/460	200/400	180M	<b>R342</b> ★	180MTFC4511	2:1	\$2,430	92.4	68.8/34.4	355	670	YD,DS	A577
	1800/1500	230/460	200/400	180L	<b>R343</b> ★	180LTFC4538	20:1	\$2,530	92.4	69.2/34.6	427	710	YD,DS	A577
	1200/1000	230/460	200/400	200L	<b>R344</b> ★	200LTFC4589	2:1	\$3,897	91.7	76/38	467	775	YD,DS	A578
<b>40-30</b>	3600/3000	230/460	200/400	200L	<b>R345</b> ★	200LTFC4511	20:1	\$3,460	92.4	89.6/44.8	522	775	YD,DS	A578
	1800/1500	230/460	200/400	200L	<b>R346</b> ★	200LTFC4538	2:1	\$3,725	94.1	95/47.5	531	775	YD,DS	A578
	1200/1000	230/460	200/400	225M	<b>R347</b> ★	225MTFC4586	2:1	\$5,855	93.0	100/50	633	845	YD,DS	A579
<b>50-37</b>	3600/3000	230/460	200/400	200L	<b>R348</b> ★	200LTFC4513	10:1	\$4,538	92.4	111.4/55.7	546	775	YD,DS	A578
	1800/1500	230/460	200/400	225S	<b>R349</b> ★	225STFC4526	10:1	\$5,168	93.6	117.6/58.8	632	845	YD,DS	A579
	1200/1000	230/460	200/400	250M	<b>R350</b> ★	250MTFC4586	2:1	\$8,207	93.0	125/62.5	655	930	YD,DS	NA

INVERTER DUTY IEC (Metric)

Blue shaded areas are Cast Iron Frames

★ Stock Model † Requires nameplate modification

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

**Footnotes:**

- YD 12 leads for Wye Delta, Part Winding on low voltage, or across-the-line starting
- DS Sourced
- d To be discontinued after current stock is gone



# Globetrotter® IEC (Metric) Frame, Three Phase

## Totally Enclosed, Flange/Base Mounting

Multiplier Symbol F4

**B3/B5 "FF"**

HP/ KW	RPM 60/50 HZ	60 HZ VOLTS	50 HZ VOLTS	IEC FRAME	CAT. NO.	MODEL NO.	CT SPEED RANGE†	LIST PRICE	NOM. EFF.	60 HZ F.L. AMPS	APPROX. WGHT. LBS.	IEC "L" DIM. (MM)	FOOT NOTES
<b>1/4-0.18</b>	3600/3000	230/460	200/400	63D	R380★	63T34FH5501	20:1	\$201	72.0	0.8/0.4	10	217	DS
	1800/1500	230/460	200/400	63D	R3881★	63T17FH5502	20:1	\$208	68.0	1.0/0.5	11	217	DS
	1200/1000	230/460	200/400	71D	R382★	71T11FH5503	20:1	\$357	64.0	1.2/0.6	12	240	DS
<b>1/3-0.25</b>	3600/3000	230/460	200/400	63D	R383★	63T34FH5504	20:1	\$233	72.0	1.1/1.55	11	217	DS
	1800/1500	230/460	200/400	71D	R384★	71T17FH5505	20:1	\$240	68.0	1.4/1.7	13	240	DS
	1200/1000	230/460	200/400	80D	R385★	80T11FH5506	20:1	\$384	70.0	1.3/1.65	17	282	DS
<b>1/2-0.37</b>	3600/3000	230/460	200/400	71D	R386★	71T34FH5507	20:1	\$239	74.0	1.6/1.8	13	240	DS
	1800/1500	230/460	200/400	71D	R387★	71T17FH5508	20:1	\$247	74.0	1.8/1.9	14	282	DS
	1200/1000	230/460	200/400	80D	R388★	80T11FH5509	20:1	\$399	72.0	1.9/1.95	19	282	DS
<b>3/4-0.55</b>	3600/3000	230/460	200/400	71D	R389★	71T34FH5510	20:1	\$253	74.0	2.4/1.2	15	282	DS
	1800/1500	230/460	200/400	80D	R390★	80T17FH5511	20:1	\$269	74.0	2.5/1.25	18	282	DS
	1200/1000	230/460	200/400	80D	R391★	80T11FH5512	20:1	\$423	72.0	2.7/1.35	22	320	DS
<b>1-0.75</b>	3600/3000	230/460	200/400	80D	<b>R392★</b>	80T34FH5513	20:1	\$278	75.5	2.8/1.4	21	282	DS
	1800/1500	230/460	200/400	80D	<b>R393★</b>	80T17FH5514	20:1	\$291	80.0	3.2/1.6	26	282	DS
	1200/1000	230/460	200/400	90SD	<b>R394★</b>	90ST11FH5515	20:1	\$445	80.0	3.3/1.7	35	320	DS
<b>1 1/2-1.1</b>	3600/3000	230/460	200/400	80D	<b>R395★</b>	80T34FH5516	20:1	\$317	84.0	4.0/2.0	30	282	DS
	1800/1500	230/460	200/400	90SD	<b>R396★</b>	90ST17FH5517	20:1	\$322	85.5	4.6/2.3	37	320	DS
<b>2-1.5</b>	3600/3000	230/460	200/400	90SD	<b>R397★</b>	90ST34FH5518	20:1	\$351	85.5	5.2/2.6	33	320	DS
	1800/1500	230/460	200/400	90SD	<b>R398★</b>	90LT17FH5519	20:1	\$361	84.0	5.8/2.9	38	320	DS
<b>3-2.2</b>	3600/3000	230/460	200/400	90LD	<b>R399★</b>	90LT34FH5520	20:1	\$497	86.5	7.2/3.6	39	320	DS

INVERTER DUTY IEC (Metric)

**B3/B14 "FT"**

HP/ KW	RPM 60/50 HZ	60 HZ VOLTS	50 HZ VOLTS	IEC FRAME	CAT. NO.	MODEL NO.	CT SPEED RANGE†	LIST PRICE	NOM. EFF.	60 HZ F.L. AMPS	APPROX. WGHT. LBS.	IEC "L" DIM. (MM)	FOOT NOTES
<b>1/4-0.18</b>	3600/3000	230/460	200/400	63C	R360★	63T34FH5401	20:1	\$197	72.0	0.8/0.4	10	217	DS
	1800/1500	230/460	200/400	63C	R361★	63T17FH5402	20:1	\$205	68.0	1.0/0.5	11	217	DS
	1200/1000	230/460	200/400	71C	R362★	71T11FH5403	20:1	\$357	64.0	1.2/0.6	12	240	DS
<b>1/3-0.25</b>	3600/3000	230/460	200/400	63C	R363★	63T34FH5404	20:1	\$231	72.0	1.1/1.55	11	217	DS
	1800/1500	230/460	200/400	71C	R364★	71T17FH5405	20:1	\$234	68.0	1.4/1.7	13	240	DS
	1200/1000	230/460	200/400	80C	R365★	80T11FH5406	20:1	\$384	70.0	1.3/1.65	17	282	DS
<b>1/2-0.37</b>	3600/3000	230/460	200/400	71C	R366★	71T34FH5407	20:1	\$235	74.0	1.6/1.8	13	240	DS
	1800/1500	230/460	200/400	71C	R367★	71T17FH5408	20:1	\$244	74.0	1.8/1.9	14	282	DS
	1200/1000	230/460	200/400	80C	R368★	80T11FH5409	20:1	\$399	72.0	1.9/1.95	19	282	DS
<b>3/4-0.55</b>	3600/3000	230/460	200/400	71C	R369★	71T34FH5410	20:1	\$247	74.0	2.4/1.2	15	282	DS
	1800/1500	230/460	200/400	80C	R370★	80T17FH5411	20:1	\$265	74.0	2.5/1.25	18	282	DS
	1200/1000	230/460	200/400	80C	R371★	80T11FH5412	20:1	\$423	72.0	2.7/1.35	22	320	DS
<b>1-0.75</b>	3600/3000	230/460	200/400	80C	<b>R372★</b>	80T34FH5413	20:1	\$272	75.5	2.8/1.4	21	282	DS
	1800/1500	230/460	200/400	80C	<b>R373★</b>	80T17FH5414	20:1	\$284	80.0	3.2/1.6	26	282	DS
	1200/1000	230/460	200/400	90SC	<b>R374★</b>	90ST11FH5415	20:1	\$445	80.0	3.3/1.7	35	320	DS
<b>1 1/2-1.1</b>	3600/3000	230/460	200/400	80C	<b>R375★</b>	80T34FH5416	20:1	\$310	84.0	4.0/2.0	30	282	DS
	1800/1500	230/460	200/400	90SC	<b>R376★</b>	90ST17FH5417	20:1	\$316	85.5	4.6/2.3	37	320	DS
<b>2-1.5</b>	3600/3000	230/460	200/400	90SC	<b>R377★</b>	90ST34FH5418	20:1	\$344	85.5	5.2/2.6	33	320	DS
	1800/1500	230/460	200/400	90SC	<b>R378★</b>	90LT17FH5419	20:1	\$351	84.0	5.8/2.9	38	320	DS
<b>3-2.2</b>	3600/3000	230/460	200/400	90LC	<b>R379★</b>	90LT34FH5420	20:1	\$497	86.5	7.2/3.6	39	320	DS

Blue shaded areas are Cast Iron Frames

★ Stock Model † Requires nameplate modification

Catalog numbers (Cat No.) highlighted in bold blue have efficiency levels that meet or exceed U.S. EPA and/or NRC Canadian standards.

**Footnotes:**  
DS Sourced

# Mounting Kits for IEC Motors

## Multiplier Symbol S4

### FF - Flange Mounting Kits

#### B5 Mounting

Frame	Frame Construction	Style Letter*	Catalog Number	KIT Number	Assembled List Price	Kit Only List Price	Bolt Circle "mm"
63	Aluminum	None	A569	KIT 635115	\$160	\$35	115
71	Aluminum	None	A570	KIT 715130	\$170	\$40	130
80	Aluminum	None	A571	KIT 805165	\$180	\$44	165
90	Aluminum	None	A572	KIT 905165	\$190	\$47	165
100	Cast Iron	None	A573	KIT 1005215	\$205	\$62	215
100	Cast Iron	A		KIT 175984	\$205	Contact Factory	215
112	Cast Iron	None	A574	KIT 1125215	\$245	\$67	215
112	Cast Iron	A		KIT 175986	\$245	Contact Factory	215
132	Cast Iron	None	A575	KIT 1325265	\$260	\$89	265
132	Cast Iron	A		KIT 175988	\$260	Contact Factory	265
160	Cast Iron	None	A576	KIT 1605300	\$370	\$168	300
160	Cast Iron	A		KIT 175990	\$370	Contact Factory	300
180	Cast Iron	None	A577	KIT 1805300	\$390	\$208	300
180	Cast Iron	A		KIT 175890	\$390	Contact Factory	300
200	Cast Iron	None	A578	KIT 2005350	\$650	\$271	350
200	Cast Iron	A		KIT 175994	\$650	Contact Factory	350
225	Cast Iron	None	A579	KIT 2255400	\$975	\$347	400
225	Cast Iron	A		KIT 175995	\$975	Contact Factory	400

Important:

For proper flange kit selection, verify whether model number contains the letter "A" in the 8th position (style Letter), and consult chart at left and below for correct kit.

INVERTER DUTY IEC (Metric)

### FT - Face Mounting Kits

#### B14 Mounting

Frame	Frame Construction	Style Letter*	Catalog Number	KIT Number	Assembled List Price	Kit Only List Price	Bolt Circle "mm"
63	Aluminum	None	A561	KIT 631475	\$155	\$31	75
71	Aluminum	None	A562	KIT 711485	\$160	\$35	85
80	Aluminum	None	A563	KIT 8014100	\$170	\$39	100
90	Aluminum	None	A564	KIT 9014115	\$180	\$43	115
100	Cast Iron	None	A565	KIT 10014130	\$190	\$57	130
100	Cast Iron	A		KIT 175985	\$190	Contact Factory	130
112	Cast Iron	None	A566	KIT 11214130	\$205	\$62	130
112	Cast Iron	A		KIT 175987	\$205	Contact Factory	130
132	Cast Iron	None	A567	KIT 13214165	\$250	\$83	165
132	Cast Iron	A		KIT 175989	\$250	Contact Factory	165
160	Cast Iron	None	A568	KIT 16014215	\$365	\$162	215
160	Cast Iron	A		KIT 175991	\$365	Contact Factory	215

\* Style letter refers to the 8th position in the motor's model number.

Example: 132STFC**A**4526

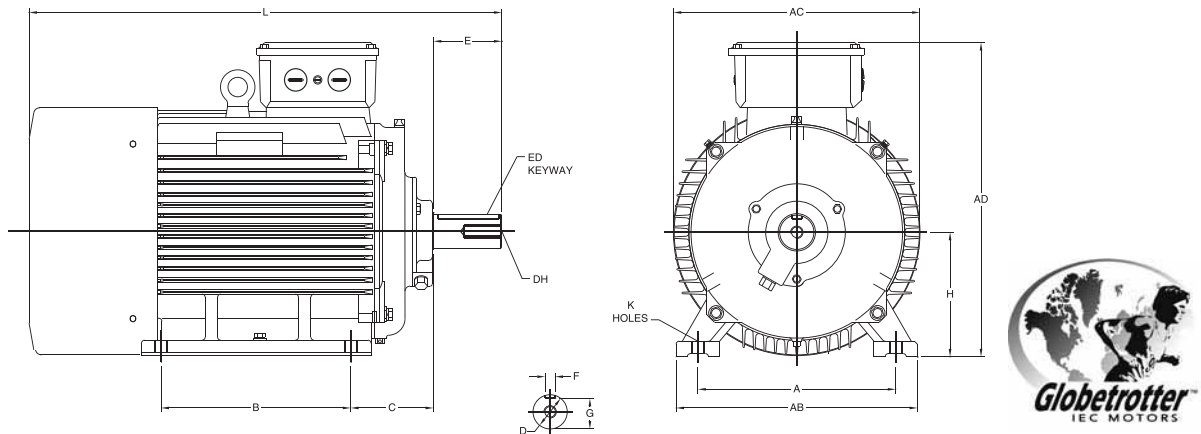
For typical outline drawing, see page 89.

**NOTE:** Assembly leadtime through Modification Center is 3-4 working days based on product availability at the time of order placement.

### Metric Flanges To Reduce Diameter For Aluminum Frame Motors Only

Motor Frame	New Frame Diameter	Catalog Number	Kit Number	Kit Only List Price
63	56	A585	KIT 175900	\$29
71	63	A586	KIT 175901	\$33
80	71	A587	KIT 175902	\$37
90	80	A588	KIT 175903	\$39

### B3 FOOT-MOUNTED

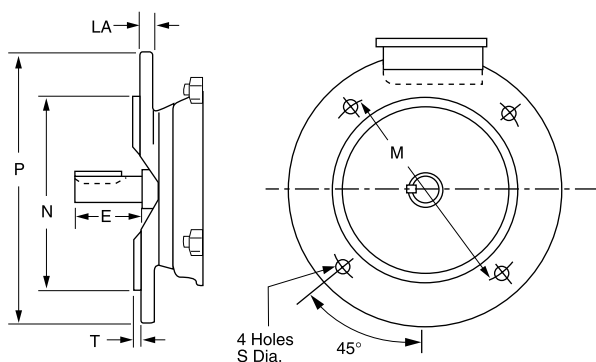


INVERTER DUTY IEC (Metric)

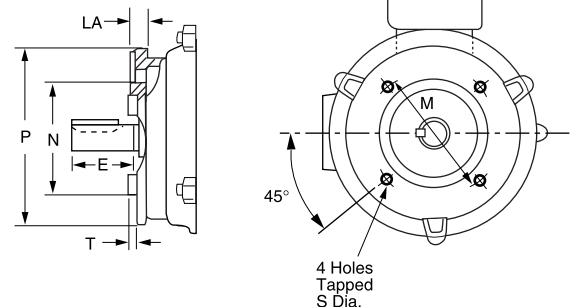
### IEC FRAME DIMENSIONS (Millimeters)

Frame	Mounting						Shaft						General			FF Flange						FT Face						
	A	B	C	H	AB	K	D	E	F	G	ED	DH	AC	AD	HD	M	N	P	S	T	LA	M	N	P	S	T	LA	
D63	100	80	40	63	119	7	11	23	4	8.5	10	M4 x 10	126	—	169	115	95	140	10	3.0	7	75	60	90	M5	2.5	7	
D71	112	90	45	71	131	7	14	30	5	11.0	20	M5 x 12.5	140	—	186	130	110	160	10	3.5	7	85	70	105	M6	2.5	9	
D80	125	100	50	80	157	10	19	40	6	15.5	25	M6 x 16	158	132	212	165	130	200	12	3.5	12	100	80	120	M6	3.0	9	
D90S	140	100	56	90	174	10	24	50	8	20.0	32	M8 x 19	178	140	230	165	130	200	12	3.5	12	115	95	140	M8	3.0	9	
D90L	140	125	56	90	174	10	24	50	8	20.0	32	M8 x 19	178	140	230	165	130	200	12	3.5	12	115	95	140	M8	3.0	9	
DF100L	160	140	63	100	205	12	28	60	8	24.0	40	M10 x 22	215	178	278	215	180	250	15	4.0	11	130	110	160	M8	3.5	14	
DF112M	190	140	70	112	245	12	28	60	8	24.0	40	M10 x 22	220	190	302	215	180	250	15	4.0	12	130	110	160	M8	3.5	11	
DF132S	216	140	89	132	280	12	38	80	10	33.0	56	M12 x 28	275	210	342	265	230	300	15	4.0	12	165	130	200	M10	3.5	14	
DF132M	216	178	89	132	280	12	38	80	10	33.0	56	M12 x 28	275	210	342	265	230	300	15	4.0	12	165	130	200	M10	3.5	14	
DF160M	254	210	108	160	325	15	42	110	12	37.0	80	M16 x 36	325	254	414	300	250	350	19	5.0	13	215	180	250	M12	4.0	13	
DF160L	254	254	108	160	325	15	42	110	12	37.0	80	M16 x 36	325	254	414	300	250	350	19	5.0	13	215	180	250	M12	4.0	13	
DF180M	279	241	121	180	335	15	48	110	14	42.5	80	M16 x 36	360	310	490	300	250	350	19	5.0	15	<b>NOT DEFINED BY IEC 72</b>						
DF180L	279	279	121	180	335	15	48	110	14	42.5	80	M16 x 36	360	310	490	300	250	350	19	5.0	15							
DF200L	318	305	133	200	395	19	55	110	16	49.0	100	M20 x 42	400	340	540	350	300	400	19	5.0	19.5							
DF225S	356	286	149	225	435	19	55*	110*	16*	49*	100*	M20 x 42	445	414	639	400	350	450	19	5.0	21.0	<b>NOT DEFINED BY IEC 72</b>						
DF225M	356	311	149	225	435	19	55*	110*	16*	49*	100*	M20 x 42	445	414	639	400	350	450	19	5.0	21.0							
DF250M	406	349	168	250	490	24	60*	140*	18*	53*	125*	M20 x 42	500	440	690	400	350	450	19	5.0	21.0							

\* 2 Pole Dimensions



FF FLANGE B5 MOUNT



FT FACE B14 MOUNT

# MOD CENTRAL - Stock Motors Only (Mult. Symbol S4 except where noted)

Contact Marathon Electric for all modification services on explosion proof motors and blower motors mounted to TEBC motors.

DESCRIPTION	LIST PRICE												
	MOD #	48	56	143-145	182-184	213-215	254-256	284-286	324-326	364-365	404-405	444-445	447- 449
Altitude / Ambient	7	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114
<b>Bearings - Drive End</b>													
Convert Ball to Roller	18	-----	-----	-----	-----	-----	-----	-----	-----	\$1,088	\$1,088	\$1,478	\$1,478
Convert Roller to Ball	18	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	\$1,478	\$1,478
Sealed Bearings	18	-----	-----	\$197	\$263	\$263	\$362	\$461	\$625	\$1,084	\$1,084	\$1,478	\$1,478
Insulated Bearings	18	-----	-----	\$461	\$526	\$526	\$1,530	\$1,645	\$1,645	\$1,737	\$1,776	\$1,882	\$2,061
<b>Blowers</b>													
Axial Blower	19	-----	-----	-----	-----	\$1,914	\$2,043	\$2,336	\$2,701	\$3,320	\$3,813	\$4,014	\$4,561
<b>Brackets*</b>													
C-Face Explosion Proof	2	-----	\$299	-----	-----	-----	\$689	\$1,146	\$1,564	\$1,799	\$1,799	\$2,867	\$3,329
C-Face Non- Explosion Proof	2	-----	\$180	\$180	\$278	\$278	\$417	\$695	\$1,042	\$1,042	\$1,042	\$1,737	\$1,737
C-Face IEEEE 841	2	-----	-----	\$268	\$412	\$412	\$613	\$951	\$1,407	\$1,407	\$1,407	\$2,295	\$2,295
D-Flange	17	-----	-----	-----	-----	-----	\$575	\$955	\$1,216	\$1,337	-----	-----	-----
<b>Brakes</b>													
3 lb-ft brakes for TEFC motors	3	-----	\$563	\$563	-----	-----	-----	-----	-----	-----	-----	-----	-----
6 lb-ft brakes for TEFC motors	3	-----	\$632	\$632	-----	-----	-----	-----	-----	-----	-----	-----	-----
10 lb-ft brakes for TEFC motors	3	-----	\$737	\$737	-----	-----	-----	-----	-----	-----	-----	-----	-----
Vertical-Above or Vertical-Below	3	-----	-----	-----	-----	\$493	\$493	-----	-----	-----	-----	-----	-----
6 lb-ft brakes for Black Max (TENV) motors	3	-----	\$638	\$638	\$638	\$638	-----	-----	-----	-----	-----	-----	-----
10 lb-ft brakes for Black Max (TENV) motors	3	-----	\$775	\$775	\$775	\$775	\$775	\$775	-----	-----	-----	-----	-----
<b>Conduit Box</b>													
Rotate Conduit Box Lead Opening	56	-----	-----	\$145	\$145	\$145	\$145	\$145	\$145	\$145	\$145	\$145	\$145
Convert to Cast Iron	56	-----	-----	\$145	\$158	\$158	\$174	\$188	\$217	-----	-----	-----	-----
Auxiliary Box (Condulet)	56	-----	-----	-----	\$217	\$217	\$289	\$289	\$289	\$434	\$434	\$434	\$434
<b>Connections</b>													
SO Cord, Plug, and Switch Single Phase	35	\$287	\$287	\$287	\$287	\$287	-----	-----	-----	-----	-----	-----	-----
<b>Drains</b>													
Condensation Drain Holes	21	-----	-----	\$171	\$171	\$171	\$191	\$191	\$191	\$191	\$191	\$191	\$191
Brass Drain & Breather	21	-----	-----	\$182	\$182	\$182	\$326	\$326	\$326	\$326	\$326	\$326	\$326
<b>Drip Cover</b>													
Canopy Cover (ODP & TEFC Motors)	4	\$145	\$145	\$145	\$145	\$191	\$287	-----	-----	-----	-----	-----	-----
<b>Encoders (NOTE: Multiplier Symbol E3)</b>													
Avtron M56	22	-----	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038
Avtron HS25A	22	-----	\$950	\$950	\$950	\$950	\$950	-----	-----	-----	-----	-----	-----
Avtron HS35A	22	-----	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291
Avtron M3	22	-----	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500
Avtron HS35M	22	-----	\$1,495	\$1,495	\$1,495	\$1,495	\$1,495	\$1,495	\$1,495	\$1,495	\$1,495	\$1,495	\$1,495
NorthStar SL56	22	-----	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038	\$2,038
Dynapar HS20	22	-----	\$600	\$600	\$600	\$600	\$600	\$600	\$600	\$600	\$600	\$600	\$600
Dynapar HS35	22	-----	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291
NorthStar HSD35	24	-----	\$1,395	\$1,395	\$1,395	\$1,395	\$1,395	\$1,395	\$1,395	\$1,395	\$1,395	\$1,395	\$1,395
BEI HS35	31	-----	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291	\$1,291
Turck A02H	-----	-----	-----	-----	-----	-----	-----	\$1,450	\$1,450	\$1,450	\$1,450	\$1,450	\$1,450
Stub Shaft (TEFC only)	42	-----	-----	-----	\$350	\$350	\$350	\$350	\$350	\$350	\$350	\$350	\$350
Encoders for Blue Max brakemotors	----	-----	-----	-----	Refer to page 37	-----	-----	-----	-----	-----	-----	-----	-----
<b>Fan</b>													
Oversized fan (Inverter Duty)	43	-----	-----	-----	-----	\$230	\$263	\$263	\$263	\$296	\$329	\$329	\$329
Non-Sparking Polypropylene Fan/ Cover	44	-----	\$179	\$179	\$225	\$225	\$261	\$261	\$299	-----	-----	-----	-----
Fan Removal	44	-----	\$145	\$145	\$182	\$182	\$217	\$217	\$217	\$254	\$254	\$254	\$254
Cast Iron Fan Cover	44	-----	-----	-----	\$145	\$145	\$188	\$188	\$217	-----	-----	-----	-----
<b>Frequency</b>													
Frequency Re-Rate 60HZ to 50HZ	7	-----	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114
<b>Grease/Fittings</b>													
Grease Relief Fittings	15	-----	-----	\$174	\$174	\$174	\$174	\$174	\$174	\$174	\$174	\$174	\$174
Zerk Fittings (Cast Iron Motors)	15	-----	-----	-----	\$276	\$276	\$276	\$276	\$276	\$276	\$276	\$276	\$276
Low Temperature Grease	15	\$461	\$461	\$461	\$816	\$816	\$816	\$816	\$816	\$1,092	\$1,461	\$1,461	\$1,461
High Temperature Grease	15	\$461	\$461	\$461	\$816	\$816	\$816	\$816	\$816	\$1,092	\$1,461	\$1,461	\$1,461
<b>Grounding</b>													
Conduit Box Grounding Lug	20	-----	\$105	\$105	\$118	\$118	\$145	\$145	\$145	\$191	\$191	\$191	\$191
On-Frame Grounding (Cast Iron Motors)	20	-----	-----	\$145	\$158	\$158	\$239	\$239	\$239	\$334	\$334	\$334	\$334
Shaft Grounding Brush	20	-----	-----	\$474	\$513	\$513	\$553	\$553	\$553	\$592	\$592	\$592	\$592
Shaft Grounding Ring	20	-----	\$395	\$441	\$456	\$472	\$681	\$711	\$788	\$950	\$1,038	\$1,327	\$1,327

\*Addition of C-Face Kit to 143-256 frame motors results in non-NEMA 'BA' dimensions - see page 92

# Stock Motors Only (Mult. Symbol S4 except where noted) - MOD CENTRAL

Contact Marathon Electric for all modification services on explosion proof motors and TEBC blower motors

DESCRIPTION	LIST PRICE												
	MOD #	48	56	143-145	182-184	213-215	254-256	284-286	324-326	364-365	404-405	444-445	447- 449
<b>Inverter Duty Motors</b>													
Variable Torque	25	-----	-----	\$278	\$278	\$278	\$278	\$278	\$278	\$278	\$278	\$278	\$278
Constant Torque (fan chg, t-stats, re-nameplate)	26	-----	-----	\$278	\$278	\$278	\$441	\$441	\$441	\$441	\$542	\$542	\$542
Constant Torque (fan chg, re-nameplate)	43	-----	-----	-----	\$230	\$230	\$263	\$263	\$263	\$296	\$329	\$329	\$329
<b>Leads</b>													
Reconnect Leads (Non-Explosion Proof)	9	\$168	\$168	\$168	\$249	\$249	\$439	\$439	\$439	\$575	\$575	\$575	\$575
Reconnect Leads (Explosion Proof)	9	-----	\$271	\$271	\$417	\$417	\$562	\$562	\$562	\$709	\$709	\$709	\$709
Terminal Lugs	13	\$125	\$125	\$125	\$145	\$145	\$158	\$158	\$158	-----	-----	-----	-----
Remark Leads	33	\$176	\$176	\$176	\$176	\$176	\$176	\$176	\$176	\$176	\$176	\$176	\$176
Longer Leads	33	\$138	\$138	\$138	\$207	\$207	\$362	\$362	\$362	\$507	\$507	\$507	\$507
<b>Mounting/ Assembly (Ex. F1 to F2)</b>													
Non-Explosion Proof	1	-----	-----	\$209	\$209	\$209	\$278	\$278	\$278	\$347	\$347	\$347	\$347
Explosion Proof	39	-----	-----	\$487	\$487	\$487	\$555	\$555	\$555	\$626	\$626	\$626	\$626
Adjustable Motor Bases	39	-----	-----	\$246	\$261	\$275	\$326	\$362	\$457	\$536	\$717	\$839	\$963
<b>Nameplates / Markings</b>													
Replacement Nameplate	7	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114
Stainless Steel Nameplate	7	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114
Separate Nameplate for Customer Data	7	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114
Additional Data on Nameplate	7	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114
CE Marking	7	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114
Rotation Arrow	7	\$114	\$114	\$114	\$114	\$114	\$114	-----	-----	-----	-----	-----	-----
<b>Packaging</b>													
Heat Treated Pallets (Air or Ground freight)	29	-----	\$50	\$50	\$50	\$125	\$125	\$250	\$250	\$250	\$250	\$250	\$250
<b>Paint</b>													
Repaint to a Marathon Stock Color	8	\$211	\$211	\$211	\$211	\$211	\$263	\$263	\$263	\$461	\$461	\$461	\$592
Paint- Special Color	8	\$211	\$211	\$211	\$211	\$211	\$263	\$263	\$263	\$461	\$461	\$461	\$592
<b>Screens</b>													
Rodent Screens	11	-----	-----	-----	-----	-----	-----	-----	-----	\$661	\$661	\$661	\$661
<b>Service Factor</b>													
AC Motor Service Factor Re-Rating	7	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114
<b>Severe Duty Construction</b>													
Cast Iron Fan Cover and Conduit Box	16	-----	-----	\$157	\$239	\$263	\$382	\$536	\$611	\$461	\$461	\$461	\$461
<b>Shaft Modifications</b>													
Drill & Tap Hole	42	-----	\$174	\$174	\$197	\$257	\$316	\$316	\$458	\$507	\$572	\$724	\$724
TS Shaft	42	-----	-----	-----	-----	-----	-----	\$1,579	\$1,579	\$1,711	\$1,911	\$1,911	\$1,911
Mill Flat on Shaft	42	-----	\$174	\$174	\$197	-----	-----	-----	-----	-----	-----	-----	-----
Steps on Shaft	42	-----	-----	\$217	\$289	\$289	\$362	\$434	\$507	\$579	\$651	\$724	\$796
Stub Shaft (TEFC only)	42	-----	-----	-----	\$350	\$350	\$350	\$350	\$350	\$350	\$350	\$350	\$350
<b>Space Heaters</b>													
ODP & TEFC	12	-----	\$278	\$278	\$400	\$400	\$471	\$471	\$471	\$661	\$661	\$661	\$661
Explosion Proof	41	-----	\$417	\$417	\$525	\$525	\$661	\$661	\$661	\$800	\$800	\$800	\$800
<b>Terminal Blocks</b>													
Terminal Block	57	-----	\$316	\$316	\$395	\$395	\$474	\$474	\$474	\$526	\$526	\$605	\$605
<b>Thermal Protection</b>													
Thermostats - Windings (Single Phase)	14	-----	\$191	\$191	\$191	\$191	-----	-----	-----	-----	-----	-----	-----
Thermostats - Windings (Three Phase)	14	-----	\$278	\$278	\$278	\$278	\$278	\$278	\$278	\$278	\$278	\$278	\$278
Thermistors (Non Explosion Proof motors)	14	-----	-----	\$522	\$522	\$522	\$522	\$522	\$522	\$522	\$522	\$522	\$522
Thermistors (Explosion Proof motors)	14	-----	-----	\$1,053	\$1,053	\$1,053	\$1,053	\$1,053	\$1,053	\$1,053	\$1,053	\$1,053	\$1,053
Thermistors (including Control Module)	14	-----	-----	\$1,391	\$1,391	\$1,391	\$1,391	\$1,391	\$1,391	\$1,391	\$1,391	\$1,391	\$1,391
Thermocouples - Winding or Bearing	14	-----	-----	\$305	\$305	\$305	\$399	\$399	\$399	\$575	\$575	\$575	\$575
Bearing Temperature Detector (RTDs)	37	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	\$3,074	\$3,074
<b>Weatherproofing / Special Service</b>													
Arctic Duty Motors -25° to -30°C Ambient)	58	-----	-----	\$278	\$400	\$400	\$471	\$471	\$471	\$661	\$661	\$661	\$661
Arctic Duty Motors -30° to -35°C Ambient)	58	-----	-----	\$730	\$1,204	\$1,204	\$1,274	\$1,274	\$1,274	\$2,101	\$2,101	\$2,101	\$2,101
Marine Duty Motors (Type 1)	7	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114	\$114
Tropical Anti- Fungus Treatment	5	\$242	\$242	\$242	\$242	\$242	\$313	\$313	\$313	\$382	\$382	\$382	\$382
Ford EM-1 Motors	48	-----	-----	\$150	\$150	\$150	\$150	\$150	\$150	\$114	\$114	\$114	\$114
Division 2 Hazardous (CSA Certified)	49	-----	-----	\$114	\$339	\$339	\$441	\$441	\$441	\$224	\$224	\$224	\$224
ATEX Zone 2 Hazardous	TBD	-----	-----	\$1,550	\$1,642	\$1,642	\$1,943	\$1,943	\$1,943	\$2,305	\$2,305	\$2,384	\$2,384

MOD CENTRAL

## MOD CENTRAL - Stock Motors Only (Mult. Symbol S4 except where noted)

Addition of C-Face kits to standard foot mount (rigid base) motors results in a non-NEMA 'BA' dimension in 143-256 frame, due to NEMA's establishment of two distinct 'BA' dimensions for each of the affected frame sizes: one for rigid base motors and another for C-Face/rigid base motors. No motor manufacturer can meet both prescribed dimensions on reworked motors. The following table identifies the 'BA' dimensions (defined as the distance from the center of the front foot hole to the shaft shoulder) for 143-256T and TC frames:

NEMA Frame	Foot Mount*	C-Face
143-145	2.38	2.75
182-184	2.75	3.50
213-215	3.50	4.25
254-256	4.25	4.75

\* C-Face Kit rework 'BA' is identical to Foot Mount 'BA'

## IEC Motors

DESCRIPTION	LIST PRICE												
	MOD #	63	71	80	90	100	112	132	160	180	200	225	250
Brackets													
FF Flange (B5)	55	\$211	\$224	\$237	\$250	\$270	\$322	\$342	\$487	\$513	\$855	\$1,283	\$1,283
FT Flange (B14)	55	\$204	\$211	\$224	\$237	\$250	\$270	\$329	\$480	----	----	----	----
Space Heaters	12	----	----	----	----	\$405	\$502	\$502	\$554	\$554	\$554	\$693	\$693
Other modifications	----	CONTACT FACTORY											

# Avtron Encoders help bulletproof your equipment... ...and your good name!

Your reputation rides on every piece of equipment you ship. Often, if there's a failure, it's a low-cost component at the root of it. In drive and motor systems, that means the encoder.

How do you "bulletproof" equipment? You start by including the most reliable encoders in the world from Avtron. Now your feedback system will shrug off dirt, dust, temperature changes, and liquids. Avtron encoders fit Marathon motors best, from the HS25A for the smallest Black Max motors, to our severe duty M685 models for big Marathon crane and mill motors.

We proudly manufacture our products in the USA.



## Reliable Optical

Avtron's HS35A and HS25A premium encoders are tougher than ordinary encoders. No more broken disks, no more failed bearings.

Select our HS25A or HS35A optical, premium encoders. No price premium.



HS25A, HS35A, and HS35M

## Rugged Magnetic

Step up to magnetic encoder reliability with the HS35M. Magnetic sensors see through dirt and moisture that stop lesser encoders.

Select the HS35M to eliminate soldered connections and to keep your application running in wet, dirty environments.

## Severe and Heavy Mill Duty

Tough choices: Select our hollow shaft M4, M6, and M685 models, or use the C-face style M56, M85, and M285 to eliminate bearings altogether. Either way, you get Wide-Gap magnetic technology that ends scraped sensors and stands up to the worst conditions.

Our heavy and severe duty magnetic encoders are like adding another layer of bulletproof Kevlar to your machine.



M1250, M285, M685, M6, M4, M56, M85, and M56 dual.

## Specify Avtron Encoders — Today!

Many Models In-Stock at Marathon; Even Non-Stock Models Have Quick Delivery!  
Turn to pages 29 and 58 in this Marathon Catalog to Select Your Avtron Encoder.

Check out our web site for more detailed specifications, drawings, and installation instructions:

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## DYNAPAR™, NORTHSTAR™ AND HENGSTLER™ ENCODERS; HAROWE™ RESOLVERS

Your Marathon Motor deserves the finest feedback... A vector duty Dynapar or NorthStar encoder. Dynapar Corporation provides more encoders for feedback on AC vector motors than all other manufacturers combined. Here are five good reasons why:

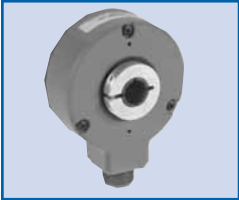
- 3 year warranty and extended temperature range models standard when supplied on a Marathon motor.
- Short circuit, reverse voltage and over voltage protection.
- Voltage regulators and differential line drivers for 5-24VDC or extra high current 5-15VDC operation.
- Robust cast and machined metal housings, rugged protective covers and hardware.
- All hollow shaft encoders have insulated hubs and tethers to protect encoder bearings against motor shaft currents.

### DYNAPAR HS20



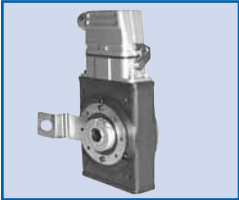
- Compact 2 inch diameter version of the famous HS35.
- Low cost market leader.
- IP65/Nema 4
- Unbreakable disk, wide gap optical technology.
- Euro connectors available.

### DYNAPAR HS35 — NEW & IMPROVED



- **NEW** – Heavy duty seals, gasketed rear cover and slinger for IP67 rating, dust & liquid tight.
- **NEW** – Lower runout, one piece metal hub with insulator, for less wallow and jitter than encoders with interchangeable inserts.
- Unbreakable disk, wide gap optical technology.
- **NEW** – More rigid unbreakable disk in 1024 and 2048 PPR models
- Single or dual output, Euro connectors available.

### NORTHSTAR HSD35 — NEW HEAVY DUTY



- Heavy duty, solderless Epic style plug-in connectors with terminal strips for easy wiring.
- IP64 and IP67 ratings for maximum protection.
- Stamped spring metal or swivel rod tether.
- Single or dual output .
- A Premium encoder at a competitive price.

### NORTHSTAR SLIM TACHS — NEW & IMPROVED SL56 / SL85/ SL1250



- Rugged, Mill Duty bearingless construction for end of motor or sandwich mounting with shaft V seals.
- Self aligning housing and easy to install and align pulse wheels.
- Recessed sensor with protective covering for no-scraper operation.
- Hard anodizing for maximum corrosion protection.
- **NEW** – Improved wide gap magnetic technology provides the industry's widest air gap variation tolerance range of .028 inches.
- **NEW** – Improved shielding and noise immunity for use with brakes and ungrounded motors.
- Positive clamping hubs (no set screws) for better grip, concentricity and less signal jitter.
- Magnetic material is molded to the wheels ( not glued on) so it cannot delaminate.
- Thermally conductive potting gets the heat out and provides greater operating headroom.
- Heavy duty, solderless Epic style plug-in connectors with terminal strips for easy wiring.
- **NEW** – Reference marker pulse is now standard on Marathon standard kits.
- **NEW** – Provisions for Marathon shaft grounding brush kit.
- **NEW** – Stainless steel model, including hub, for Food Processing and Marine applications.

To view our complete family of popular encoders including the Dynapar ACURO® Absolute encoder range and NorthStar RIM Tach Mill Duty series, we invite you to visit our website at [www.dynapar.com](http://www.dynapar.com)



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Website: [www.dynapar.com](http://www.dynapar.com)

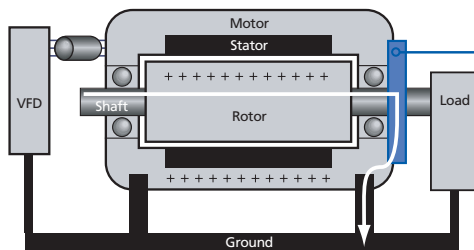


# Extend the Life of Your Motor

Protect your Marathon motor against electrical bearing damage from VFD-induced shaft currents



The World's Most Effective Shaft Grounding Brush!



- Maintenance-free
- Easily installed in minutes – **even in the field**
- Convenient mounting brackets – no machining required
- Contamination-proof – unaffected by dirt, grease, or other contaminants
- Lasts for life of motor
- Standard sizes for 1 to 1500 HP AC motors
- Shaft diameters from 0.311" to 6.020" (8 mm to 153 mm)
- Larger sizes for shafts greater than 6"



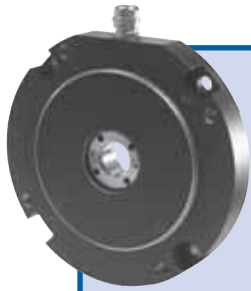
\* Patents Pending



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sales@est-aegis.com  
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KEY SUPPLIERS



## Model 770 4.5" Pilot C-Face Thru-Bore

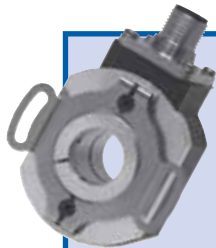
- Fits NEMA Size 56C Thru 184C Motor Faces
- Bore Sizes From 5/8" to 1" and 14 mm to 24 mm
- Temperatures to +100° C, Resolutions to 4096
- Select This Encoder When Using Black Max® Motors

## Model 865T Stainless Steel Thru-Bore

- Specs Same As Model 770 But With Stainless Steel Housing That Can Be Sealed To IP66
- Perfect For PowerWash™ SXT and SXT-Plus Wash-Down Duty Motors; Available On A Production Basis



Visit [www.encoder.com](http://www.encoder.com) To See Our Entire  
Line Of Motor Mount Encoders!



## Model 260 Versatile 2" Commutated Thru-Bore

- Temperatures Ranges From -40° to +120° C
- Bore Sizes From 1/4" To 5/8" and 5 mm to 15 mm
- Up to 12 Pole Commutation (6 Pole Pairs)
- Uni-Cover Kit Available For Added Protection
- Sized For microMAX™ and Smaller Black Max® Motors



## Models 775 and 776 Slim 4.5" Thru-Bores

- Bore Sizes From 5/8" to 1-7/8" and 14 mm to 43 mm
- Temperatures to 100° C, Resolutions to 4096
- Perfect Choice For Blue Max® Motors

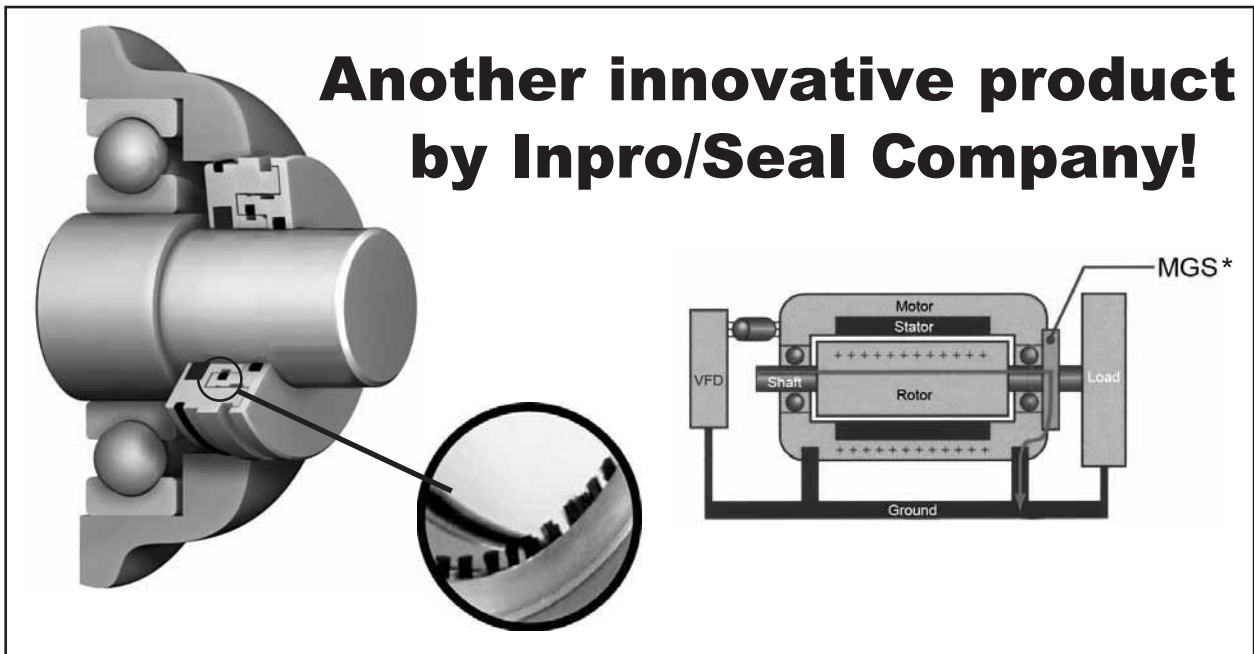


### All These Encoders Feature:

- Low Profile For Easy Motor Mount Installation
- 5 to 28 VDC Input Voltage
- Opto-ASIC Technology For The Ultimate In Reliability And Performance!
- Large Selection of Popular Connector Options
- All Metal Housings with Precision Bearings For Rugged Applications

RoHS and CE Compliance Available

# The Inpro/Seal® MGS\* for Marathon Motors



## Motor Grounding Seal (MGS™\*) \*Patent Pending

**Electric motors** that are controlled by variable frequency drives (VFD) usually have destructive induced shaft currents that are discharged through the bearings, causing them to deteriorate and fail. The stray electrical currents can cause fusion craters, pitting, fluting and premature failure of the bearings.

**Now**, the Inpro/Seal® Company has combined with the AEGIS™ SGR™ Patent Pending Shaft Grounding Technology by Electro Static Technology-ITW to offer an innovative Bearing Isolator that directs the stray shaft currents away from the bearings while at the same time, permanently protects the bearings from environmental lubricant contamination.

The Bearing Isolator and the grounding ring are both absolutely maintenance-free and are designed to last as long as the normal design life of the motor.



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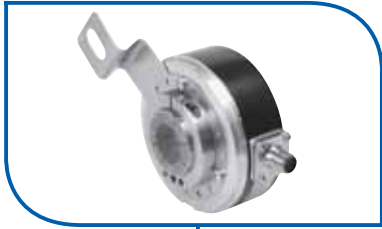
KEY SUPPLIERS

# Strong partners delivering strong performance...

**TURCK**  
*works*

**Kübler**  
*by* **TURCK**

**Industrial Automation**



Integrated LED Cordsets



Marathon motors have long been the standard for quality and rugged performance. But as today's applications become increasingly more demanding, it makes sense to supplement that quality with the best feedback technology available. An encoder specifically designed for your motor will help ensure the reliability of your process.

**Kübler by TURCK** offers just such an encoder family, with standard features engineered for Marathon motors, including:

- Mechanically locked bearings for superior encoder performance
- Isolation inserts for electrical and thermal protection of the bearings
- Wide range of resolutions and output types
- Optional protective covers for 4.5 inch C-face and fan cover applications
- Robust stainless steel hub and clamp assembly
- Molded M12 connection system with optional integrated LEDs; MS 10-pin available
- High temperature
- High speed
- 3 year warranty

Now that you've chosen the best motor for the job, you shouldn't be asked to settle for anything less from the encoder. Custom connectors? Mating cordsets? No problem. We've been delivering tailor-made solutions to the industrial marketplace for more than 40 years. With **Kübler by TURCK** and Marathon on your team, success is only a phone call away.

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Molded M12 Connectors



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KEY SUPPLIERS

Catalog Number/Model Number

CAT. NO.	MODEL NO.	PAGE NO.	NEW LIST	MULT. SYMB.	CAT. NO.	MODEL NO.	PAGE NO.	NEW LIST	MULT. SYMB.
A157 *	KIT VRT87BRK	37	\$375	E3	A763 *	KIT LKSR02	23, 29	\$2,038	E3
A197 *	KIT 197	73	\$24	S4	A764 *	KIT LKSR03	29	\$2,038	E3
A199 *	KIT 199	73	\$28	S4	A772 *	KIT HS351024-NV	23, 29	\$1,291	E3
A234 *	KIT 234	73	\$21	S4	A774 *	KIT HS351024-FC	29	\$1,291	E3
A297 *	KIT 3BRK3A	73	\$355	S4	A775 *	KIT HS351024-BC	29	\$1,291	E3
A298 *	KIT 6BRK3A	73	\$419	S4	A776 *	KIT HS352048-NV	23, 29	\$1,291	E3
A299 *	KIT 10BRKA	73	\$518	S4	A777 *	KIT HS352048-FC	29	\$1,291	E3
A301 *	KIT 3BRK3	73	\$355	S4	A778 *	KIT HS352048-BC	29	\$1,291	E3
A302 *	KIT 6BRK3	73	\$419	S4	A779 *	KIT HS35B1024-NV	23, 29	\$1,291	E3
A303 *	KIT 10BRK	73	\$518	S4	A780 *	KIT HS35B2048-NV	23, 29	\$1,291	E3
A312 *	KIT BM6BRK	23, 30	\$638	S4	A781 *	KIT HS35B1024-BC	29	\$1,291	E3
A313 *	KIT BM10BRK	23, 30	\$775	S4	A782 *	KIT HS35B2048-BC	29	\$1,291	E3
A315 *	KIT BM6BRK575	23, 30	\$638	S4	A783 *	KIT HS35B1024-FC	29	\$1,291	E3
A316 *	KIT BM10BRK575	23, 30	\$775	S4	A784 *	KIT HS35B2048-FC	29	\$1,291	E3
A317 *	KIT BM6BRK115	23, 30	\$638	S4	A785 *	KIT LKSR512	23	\$2,038	S4
A318 *	KIT BM10BRK115	23, 30	\$775	S4	A786 *	KIT LKSR-CFACE	23, 29, 37	\$2,241	E3
A561 *	KIT 631475	80	\$43	S4	A789 *	KIT SL561024-182NV	37	\$2,241	E3
A562 *	KIT 711485	80	\$47	S4	A790 *	KIT SL561024-184NV	37	\$2,750	E3
A563 *	KIT 8014100	80	\$53	S4	A791 *	KIT SL561024-210NV	37	\$2,750	E3
A564 *	KIT 9014115	80	\$58	S4	A792 *	KIT SL561024-250NV	37	\$2,750	E3
A565 *	KIT 10014130	80	\$77	S4	A793 *	KIT M561024-NV	23, 29	\$2,038	E3
A566 *	KIT 11214130	80	\$84	S4	A794 *	KIT M561024-BC	29	\$2,038	E3
A567 *	KIT 13214165	80	\$112	S4	A795 *	KIT L449BBFS-322	23	\$1,421	S4
A568 *	KIT 16014215	80	\$219	S4	A796 *	KIT L449TEBC	23	\$3,465	S4
A569 *	KIT 635115	80	\$47	S4	A797 *	KIT LKSR2048	23	\$2,038	S4
A570 *	KIT 715130	80	\$55	S4	A801 *	KIT ENCBOX	29	\$136	E3
A571 *	KIT 805165	80	\$60	S4	A807 *	KIT STUBSHAFT 1IN	78	\$150	E3
A572 *	KIT 905165	80	\$63	S4	C380 *	184TTFR4380	72	\$693	E8
A573 *	KIT 1005215	80	\$84	S4	C381 *	182TTFR4320	73	\$707	E8
A574 *	KIT 1125215	80	\$90	S4	C382 *	182TTFR4340	73	\$632	E8
A575 *	KIT 1325265	80	\$120	S4	C383 *	182TTFR4345	73	\$632	E8
A576 *	KIT 1605300	80	\$227	S4	C384 *	213TTFW4380	73	\$884	E8
A577 *	KIT 1805300	80	\$281	S4	C385 *	184TTFR4320	73	\$755	E8
A578 *	KIT 2005350	80	\$367	S4	C386 *	184TTFR4340	73	\$666	E8
A579 *	KIT 2255400	80	\$470	S4	C387 *	184TTFR4345	73	\$666	E8
A585 *	KIT 175900	80	\$39	S4	C388 *	215TTFW4380	73	\$1,054	E8
A586 *	KIT 175901	80	\$45	S4	C389 *	213TTFW4320	73	\$980	E8
A587 *	KIT 175902	80	\$50	S4	C390 *	213TTFW4340	73	\$884	E8
A588 *	KIT 175903	80	\$53	S4	C391 *	213TTFW4345	73	\$884	E8
A668 *	KIT A02H1024-BC-LED	29	\$1,450	---	C392 *	215TTFW4320	73	\$1,020	E8
A669 *	KIT A02H2048-BC-LED	29	\$1,450	---	C393 *	215TTFW4340	73	\$972	E8
A687 *	KIT HS201024-NV	23	\$600	S4	C394 *	215TTFW4345	73	\$972	E8
A688-10*	KIT A688-10	23, 30	\$249	E3	C400 *	145TTFR5382	82	\$1,167	E5
A688-50*	KIT A688-50	23, 30	\$647	E3	C401 *	145TTFR5360	82	\$977	E5
A690-15*	KIT A690-15	23, 30	\$206	S4	C402 *	184TTTL7084	82	\$1,301	E5
A711 *	KIT HSD351024-NV	23	\$1,395	S4	C403 *	145TTFR5359	82	\$1,026	E5
A712 *	KIT HSD351024-FC	23	\$1,395	S4	C404 *	184TTTL7083	82	\$1,358	E5
A736 *	KIT HS35A1024-NV	23	\$1,291	S4	C405 *	182TTTL7034	82	\$1,358	E5
A737 *	KIT HS35A1024-FC	23	\$1,291	S4	C406 *	184TTTL7041	82	\$1,836	E5
A738 *	KIT HS35A1024-BC	23	\$1,291	S4	C407 *	213TTTL7034	82	\$2,411	E5
A740 *	KIT HS35A2048-FC	23	\$1,291	S4	C408 *	215TTTL7050	82	\$3,014	E5
A741 *	KIT HS35A2048-BC	23	\$1,291	S4	D390 *	56T34F5303	72	\$203	F2
A742 *	KIT HS35M1024	23	\$1,495	S4	D391 *	56T34F5301	72	\$226	F2
A743 *	KIT HS35M1024-BC	23	\$1,495	S4	D392 *	56T34F5302	72	\$264	F2
A744 *	KIT HS35M2048	23	\$1,495	S4	D393 *	56T34F5303	72	\$294	F2
A745 *	KIT HS35M2048-BC	23	\$1,495	S4	D394 *	56T34F5304	72	\$351	F2
A746 *	KIT HS25A1024-NV	23	\$950	S4	D395 *	56T34F5305	72	\$405	F2
A747 *	KIT HS25A2048-NV	23	\$950	S4	D396 *	56T34F5306	73	\$450	F2
A748 *	KIT M561024BRK-140	37	\$2,038	E3	D450 *	56T17F5348	82	\$561	E5
A749 *	KIT M561024BRK-182	37	\$2,038	E3	D451 *	56T11F5325	82	\$561	E5
A750 *	KIT M851024BRK-184	37	\$2,750	E3	D452 *	56T17F5349	82	\$631	E5
A751 *	KIT M851024BRK-210	37	\$2,750	E3	D453 *	56T11F5326	82	\$927	E5
A752 *	KIT M851024BRK-250	37	\$2,750	E3	D454 *	56T17F5350	82	\$741	E5
A753 *	KIT M31023-NV	23	\$2,500	S4	D455 *	56T11F5327	82	\$1,089	E5
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E2002 *	145TTFR6078	74	\$536	E9	E482 *	254TTFNA6529	76	\$1,626	E9
E2003 *	143TTFR5582	74	\$515	E9	E483 *	284TTFNA6876	76	\$2,896	E9
E2004 *	145TTFR6033	74	\$485	E9	E484 *	256TTFNA6523	76	\$2,146	E9
E2005 *	182TTFR6076	74	\$701	E9	E485 *	256TTFNA6529	76	\$2,026	E9
E2006 *	145TTFR3002	74	\$571	E9	E486 *	286TTFNA6876	76	\$3,528	E9
E2007 *	145TTFR6035	74	\$531	E9	E488 *	284TTFNA6837	76	\$2,413	E9
E2008 *	184TTFR6076	74	\$803	E9	E490 *	286TSTFNA6804	77	\$3,087	E9
E2009 *	182TTFR6001	74	\$740	E9	E491 *	286TTFNA6570	77	\$2,805	E9
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E2015 *	213TTFW6001	74	\$1,054	E9	E602 *	184TTFS6501	76	\$917	E9
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E2018 *	215TTFW6001	74	\$1,122	E9	E604 *	215TTFS6501	76	\$1,293	E9
E2019 *	215TTFW6026	74	\$1,089	E9	E605 *	254TTFNA6501	76	\$1,732	E9
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E345	449TTFS16534	78	\$27,438	E9	E607 *	284TSTFNA6501	76	\$2,644	E9
E361		78	\$60,474	S6	E608 *	286TSTFNA6501	77	\$3,087	E9
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E364		78	\$59,263	S6	E610 *	326TSTFS6501	77	\$5,268	E9
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E368		78	\$102,291	S6	E613 *	405TSTFS6501	77	\$11,660	E9
E369		78	\$51,543	S6	E614 *	444TSTFS6501	77	\$15,243	E9
E400	326TTFS6580	77	\$4,926	E9	E615 *	445STFN6501	78	\$18,311	E9
E401	364TTFS6590	77	\$6,675	E9	E616 *	182TTTS6526	75	\$740	E9
E402	365TTFS6590	77	\$7,666	E9	E617 *	184TTFS6526	76	\$858	E9
E403	404TTFS6592	77	\$8,982	E9	E618 *	213TTFS6526	76	\$1,051	E9
E404	405TTFS6587	77	\$10,574	E9	E619 *	215TTFS6526	76	\$1,266	E9
E405	444TTFS6590	77	\$15,592	E9	E620 *	254TTFNA6526	76	\$1,626	E9
E406	445TTFN6590	77	\$17,750	E9	E621 *	256TTFNA6526	76	\$2,026	E9
E407	445TTFN6591	78	\$19,859	E9	E622 *	284TTFNA6526	76	\$2,413	E9
E408	449TTFS6582	78	\$24,311	E9	E623 *	286TTFNA6526	77	\$2,805	E9
E448 *	445TTFN6587	78	\$19,859	E9	E624 *	324TTFS6526	77	\$3,726	E9
E449 *	445STFN6505	78	\$23,164	E9	E625 *	326TTFS6526	77	\$4,576	E9
E450 *	445TTFN6540	78	\$24,011	E9	E626 *	364TTFS6536	77	\$6,565	E9
E453 *	326TSTFS6536	77	\$4,576	E9	E627 *	365TTFS6536	77	\$8,322	E9
E454 *	364TSTFS6526	77	\$6,565	E9	E628 *	405TTFS6536	77	\$10,282	E9
E455 *	365TSTFS6526	77	\$8,322	E9	E629 *	444TTFS6536	77	\$13,535	E9
E456 *	405TSTFS6526	77	\$10,282	E9	E630 *	445TTFN6536	78	\$15,736	E9
E457 *	444TSTFS6526	77	\$13,535	E9	E631 *	445TTFN6538	78	\$19,138	E9
E458 *	445STFN6526	78	\$15,736	E9	E632 *	182TTTS6576	75	\$737	E9
E459 *	445STFN6528	78	\$19,138	E9	E633 *	184TTTS6576	75	\$911	E9
E461 *	143TTTN6563	75	\$458	E9	E634 *	213TTFS6576	75	\$1,122	E9
E462	145TTTN6584	75	\$576	E9	E635 *	215TTFS6576	76	\$1,378	E9
E463	143TTTN6502	75	\$573	E9	E636 *	254TTFNA6576	76	\$1,786	E9
E464 *	145TTTN6834	75	\$497	E9	E637 *	256TTFNA6576	76	\$2,182	E9
E465 *	182TTTS6578	75	\$737	E9	E638 *	284TTFNA6576	76	\$2,896	E9
E466	145TTTN6521	75	\$601	E9	E639 *	286TTFNA6576	76	\$3,528	E9
E467 *	145TTTN6835	75	\$546	E9	E640 *	324TTFS6576	76	\$4,276	E9
E468 *	184TTTS6582	75	\$911	E9	E641 *	326TTFS6576	77	\$4,926	E9
E470 *	182TTTS6538	75	\$740	E9	E642 *	364TTFS6586	77	\$6,675	E9
E471 *	213TTFS6594	75	\$1,122	E9	E643 *	365TTFS6586	77	\$7,666	E9
E472 *	184TTFS6810	76	\$917	E9	E644 *	404TTFS6586	77	\$8,982	E9
E473 *	184TTFS6844	76	\$858	E9	E645 *	405TTFS6586	77	\$10,574	E9
E474 *	215TTFS6881	76	\$1,378	E9	E646 *	444TTFS6586	77	\$14,451	E9
E475 *	213TTTS6502	76	\$1,108	E9	E647 *	445TTFN6586	77	\$17,750	E9
E476 *	213TTFS6531	76	\$1,051	E9	E648 *	143TTTN6576	75	\$561	E9
E477 *	254TTFNA6590	76	\$1,786	E9	E649 *	143TTTN6526	75	\$458	E9
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E652 ★	145TTTN6526	75	\$497	E9	E724 ★	284TTDC4026	68	\$1,612	E2
E653 ★	145TTTN6501	75	\$601	E9	E725 ★	286TTDC4026	68	\$1,875	E2
E654 ★	145TTTN6527	75	\$546	E9	E726 ★	324TTDC4026	68	\$2,332	E2
E655 ★	184TTFS6505	76	\$917	E9	E727 ★	326TTDC4026	68	\$2,718	E2
E656 ★	213TTTS6505	76	\$1,108	E9	E728 ★	145TTDR4076	67	\$364	E2
E657 ★	215TTFS6505	76	\$1,293	E9	E729 ★	182TTDR4076	67	\$400	E2
E658 ★	254TTFNA6503	76	\$1,732	E9	E730 ★	184TTDR4076	67	\$514	E2
E659 ★	256TTFNA6503	76	\$2,146	E9	E731 ★	213TTDW4076	67	\$695	E2
E660 ★	284TSTFNA6502	76	\$2,644	E9	E732 ★	215TTDW4076	67	\$809	E2
E662 ★	324TSTFS6505	76	\$4,072	E9	E733 ★	254TTDX4076	67	\$1,012	E2
E663 ★	326TSTFS6502	77	\$5,268	E9	E734 ★	256TTDX4076	67	\$1,180	E2
E664 ★	364TSTFS6505	77	\$6,929	E9	E735 ★	284TSDP4076	67	\$1,697	E2
E665 ★	365TSTFS6502	77	\$8,702	E9	E736	286TSDP4076	68	\$2,082	E2
E666 ★	143TTTN6530	75	\$458	E9	E737 ★	324TSDP4076	68	\$2,470	E2
E667 ★	145TTTN6529	75	\$497	E9	E738 ★	326TSDP4076	68	\$2,825	E2
E668 ★	145TTTN6530	75	\$546	E9	E739 ★	364TTDC4036	68	\$3,332	E2
E669 ★	182TTTS6530	75	\$740	E9	E740 ★	365TTDC4036	68	\$4,058	E2
E670 ★	184TTFS6530	76	\$858	E9	E741 ★	404TTDS4036	68	\$5,175	E2
E671 ★	213TTFS6530	76	\$1,051	E9	E742 ★	405TTDS4036	68	\$6,196	E2
E672 ★	215TTFS6530	76	\$1,266	E9	E743 ★	444TTDS4036	68	\$8,949	E2
E673 ★	254TTFNA6528	76	\$1,626	E9	E744 ★	445TTDS4036	68	\$11,305	E2
E674 ★	256TTFNA6528	76	\$2,026	E9	E746 ★	364TTDS4086	68	\$4,153	E2
E675 ★	284TTFNA6527	76	\$2,413	E9	E747 ★	365TTDS4086	68	\$4,850	E2
E676 ★	286TTFNA6527	77	\$2,805	E9	E748 ★	404TTDS4086	68	\$5,658	E2
E677 ★	324TTFS6527	77	\$3,726	E9	E753 ★	365STDS4001	68	\$5,882	E2
E678 ★	326TTFS6527	77	\$4,576	E9	E754 ★	404STDS4001	68	\$6,905	E2
E679 ★	364TTFS6537	77	\$6,565	E9	E755 ★	405STDS4001	68	\$8,901	E2
E680 ★	365TTFS6537	77	\$8,322	E9	E756 ★	444STDS4001	68	\$11,634	E2
E681 ★	405TTFS6538	77	\$10,282	E9	E758 ★	213TTDW4030	67	\$591	E2
E682 ★	445TTFN6537	78	\$15,736	E9	E759 ★	215TTDW4030	67	\$759	E2
E683 ★	215TTFS6580	76	\$1,378	E9	E760 ★	254TTDX4030	67	\$1,137	E2
E684 ★	254TTFNA6578	76	\$1,786	E9	E761 ★	256TTDX4032	68	\$1,388	E2
E685 ★	256TTFNA6578	76	\$2,182	E9	E762 ★	284TTDP4035	68	\$1,612	E2
E687 ★	449TTFS6588	78	\$24,311	E9	E763 ★	286TTDP4034	68	\$1,875	E2
E688	449TTFS6587	78	\$27,946	E9	E764 ★	324TTDP4028	68	\$2,332	E2
E690 ★	449TTFS6538	78	\$27,612	E9	E765 ★	326TTDP4048	68	\$2,718	E2
E691 ★	449TTFS6537	78	\$27,438	E9	E768 ★	364STDC4026	68	\$3,332	E2
E692 ★	449TTFS6536	78	\$35,804	E9	E769	449TSTFS6501	78	\$43,424	E9
E694 ★	284TTFNA6580	76	\$2,896	E9	E770 ★	449TTFS6530	78	\$22,009	E9
E695 ★	286TTFNA6580	76	\$3,528	E9	E771 ★	449TTFS6528	78	\$27,612	E9
E696	324TTFS6577	76	\$4,276	E9	E772	449TTFS6527	78	\$27,438	E9
E697 ★	444TTFS6540	77	\$13,535	E9	E773 ★	449TTFS6578	78	\$24,311	E9
E698	449TSTFS6502	78	\$37,866	E9	E774	449TTFS6577	78	\$27,946	E9
E699	449TSTFS6503	78	\$29,214	E9	E776	449TTFS16553	78	\$36,759	E9
E702 ★	145TTDR5304	67	\$364	E2	E777		78	\$37,584	E9
E704 ★	182TTDR4001	67	\$438	E2	E780 ★	404STDS4026	68	\$5,175	E2
E705 ★	184TTDR4001	67	\$567	E2	E781 ★	405STDS4026	68	\$6,196	E2
E706 ★	213TTDW4001	67	\$736	E2	E782 ★	365STDC4026	68	\$4,058	E2
E707 ★	215TTDW4001	67	\$1,132	E2	E783 ★	143TTDR5313	67	\$309	E2
E708 ★	254TTDX4001	68	\$1,334	E2	E784 ★	145TTDR5325	67	\$382	E2
E709 ★	256TTDX4001	68	\$1,628	E2	E789 ★	324TSTDP4032	68	\$2,332	E2
E710 ★	284TSDP4001	68	\$1,943	E2	E791 ★	326TSDP4036	68	\$2,718	E2
E711 ★	286TSDP4001	68	\$2,486	E2	E792 ★	444STDS4026	68	\$8,949	E2
E712 ★	324TSDP4001	68	\$2,954	E2	E800 ★	284TFFPA4030	70	\$1,778	E1
E713 ★	326TSDP4001	68	\$3,359	E2	E801 ★	326TSTFPA4036	71	\$3,595	E1
E714 ★	364TSTDS4001	68	\$4,478	E2	E802 ★	364TSTFS4026	71	\$5,275	E1
E715 ★	143TTDR5347	67	\$278	E2	E803 ★	404TTFS4086	71	\$6,508	E1
E716 ★	145TTDR5630	67	\$303	E2	E804 ★	365TSTFS4026	71	\$6,742	E1
E717	145TTDR5631	67	\$334	E2	E805 ★	365TTFS4040	71	\$6,742	E1
E718 ★	182TTDB4026	67	\$391	E2	E806 ★	405TTFS4086	71	\$7,821	E1
E719 ★	184TTDB4026	67	\$425	E2	E807 ★	405TSTFS4001	71	\$9,016	E1
E720 ★	213TTDBA4026	67	\$591	E2	E808 ★	405TSTFS4026	71	\$8,132	E1
E721 ★	215TTDBA4026	67	\$759	E2	E809 ★	444TTFS4086	71	\$11,007	E1
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E812 *	445STFN4005	71	\$18,811	E1	E994 *	145TTFR4001	69	\$397	E8
E813 *	445STFN4028	71	\$15,500	E1	E995 *	184TTFR4076	69	\$470	E8
E814 *	449TTFS4088	71	\$16,787	E1	E996 *	254TTFL14026	70	\$1,167	E8
E815 *	324TTFPA4030	70	\$2,792	E1	E999 *	284TSTFPA4036	70	\$1,778	E1
E816 *	324TSTFPA4036	70	\$2,792	E1	G044 *	48T17D2000	67	\$182	F1
E817 *	286TTFPA4030	70	\$2,159	E1	G047 *	56T17D2095	67	\$212	F1
E818 *	286TSTFPA4036	70	\$2,159	E1	G063 *	56T17D2094	67	\$239	F1
E820 *	324TTFPA4076	70	\$3,089	E1	G067 *	56T11D5302	67	\$320	F1
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E826 *	143TTTC4026	69	\$342	E1	G084 *	56T17D2093	67	\$267	F1
E827 *	143TTFR4030	69	\$325	E8	G086 *	56T17D2110	67	\$267	F1
E832 *	143TTFR4001	69	\$342	E8	G303 *	56T17F2034	69	\$224	F1
E837 *	145TTTC4026	69	\$380	E1	G306 *	56T11F5301	69	\$314	F1
E838 *	145TTFR4038	69	\$362	E8	G308 *	56T34F5328	69	\$203	F1
E846 *	145TTTC4027	69	\$418	E1	G321 *	56T17F2035	69	\$250	F1
E847 *	145TTFR4039	69	\$397	E8	G324 *	56T11F5302	69	\$345	F1
E851 *	143TTTN6505	75	\$573	E9	G326 *	56T34F5329	69	\$242	F1
E852 *	145TTTN6505	75	\$601	E9	G327 *	56T34F5334	69	\$242	F1
E854 *	449TTFS6540	78	\$22,009	E9	G329 *	56T17F2037	69	\$276	F1
E856 *	449TTFS6564	78	\$22,009	E9	G340 *	56T17F2046	69	\$276	F1
E912 *	143TTDR5351	67	\$278	E2	G342 *	56T11F5303	69	\$357	F1
E913 *	145TTDR5640	67	\$303	E2	G344 *	56T34F5330	69	\$272	F1
E914 *	145TTDR5665	67	\$334	E2	G345 *	56T34F5335	69	\$272	F1
E915 *	182TTDR4030	67	\$391	E2	G347 *	56T17F5302	69	\$289	F1
E916 *	184TTDR4030	67	\$425	E2	G348 *	56T17F5307	69	\$289	F1
E950 *	143TTFR4026	69	\$325	E8	G360 *	56T11F5304	69	\$382	F1
E951 *	145TTFR4026	69	\$362	E8	G365 *	56T17F5303	69	\$330	F1
E952 *	145TTFR4027	69	\$397	E8	G580 *	56T17T5305	72	\$260	F2
E953 *	182TTFB4026	69	\$425	E8	G581 *	56T17F5321	72	\$288	F2
E954 *	184TTFB4026	70	\$425	E8	G582 *	56T17F5322	72	\$315	F2
E955 *	213TTFW4026	70	\$711	E8	G583 *	56T17F5323	72	\$322	F2
E956 *	215TTFW4026	70	\$861	E8	G584 *	56T17F5324	72	\$352	F2
E957 *	365TTFS4036	71	\$6,742	E1	G585 *	56T17F5325	72	\$383	F2
E958 *	445TTFN4087	71	\$14,751	E1	G586 *	56T11F5311	72	\$321	F2
E959 *	405TTFS4036	71	\$8,132	E1	G587 *	56T11F5310	72	\$338	F2
E960 *	364STFS4001	71	\$5,613	E1	G588 *	56T11F5309	72	\$368	F2
E961 *	284TTFC4026	70	\$1,778	E1	G589 *	56T11F5308	72	\$379	F2
E962 *	326TTFC4026	71	\$3,595	E1	G590 *	56T17F5355	73	\$430	F2
E963 *	184TTFR4001	70	\$555	E8	H149 *	445TTDS7372	68	\$11,662	E6
E964 *	286TSTFPA4001	70	\$2,157	E1	H150 *	143TTDR5376	67	\$300	E6
E965 *	256TTFL14026	70	\$1,437	E8	H178 *	447TSTDN7001	68	\$15,826	E6
E966 *	326TTFS4080	70	\$3,772	E1	H193 *	447TSTDN7003	68	\$18,128	E6
E967 *	182TTFR4001	69	\$449	E8	H812 *	447TSTDN7026	68	\$12,937	E6
E968 *	286TTFC4076	70	\$2,547	E1	H813 *	447TSTDN7027	68	\$14,278	E6
E969 *	215TTFW4001	70	\$847	E8	H814 *	447TSTDN7028	68	\$15,153	E6
E970 *	215TTFW4076	70	\$897	E8	H817 *	447TSTDN7005	68	\$20,626	E6
E971 *	324TSTFPA4001	70	\$2,829	E1	H818 *	449TSTDN7001	68	\$21,030	E6
E972 *	213TTFW4001	70	\$725	E8	H819 *	449TSTDN7003	68	\$22,862	E6
E975 *	284TSTFPA4001	70	\$1,957	E1	K000 *	56T34D5302	67	\$246	F1
E976 *	326TSTFPA4001	71	\$3,922	E1	K004 *	56T17D2092	67	\$274	F1
E978 *	284TTFC4076	70	\$2,132	E1	K009 *	56T34D5303	67	\$303	F1
E979 *	145TTFR4076	69	\$414	E8	K049 *	56T17D2130	67	\$274	F1
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E981 *	445STFN4001	71	\$15,054	E1	K702 *	56T34T5309	72	\$203	F2
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L413 *	256TTFPA8102	70	\$2,449	E6	N610 *	145TTVR5302	79	\$714	F3
L414 *	284TTFPA8102	70	\$2,902	E6	N611 *	56T17W5327	79	\$662	F3
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Y368 *	145THFR5329	18	\$691	E3	Y556 *	56H17T5312	22	\$521	E3
Y369 *	145THFR5330	18	\$691	E3	Y557 *	145THTN6060	22	\$898	E3
Y370 *	182THFR5329	18	\$815	E3	Y558 *	182THTL7736	22	\$1,113	E3
Y371	182THFR5330	18	\$815	E3	Y559 *	184THTL7736	22	\$1,329	E3
Y372 *	184THFR7726	18	\$967	E3	Y560 *	213THTL7736	22	\$1,745	E3
Y373	184THFR7736	18	\$967	E3	Y561 *	215THTL7736	22	\$2,087	E3
Y374 *	56H17T2018	19	\$301	E3	Y562 *	254THTL5736	22	\$2,484	E3
Y375 *	56H17T2020	19	\$301	E3	Y563 *	256THTNA7036	22	\$3,626	E3
Y376 *	56H17F2018	19	\$372	E3	Y564 *	184THTS8028	28	\$1,427	E3
Y377	56H17F2016	19	\$372	E3	Y565 *	213THTS8038	28	\$1,922	E3
Y378 *	56H17F2022	19	\$419	E3	Y566 *	215THTS8038	28	\$2,280	E3
Y379 *	56H17F2020	19	\$419	E3	Y567 *	284THTNA7036	22	\$3,944	E3

\* Stock Model

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Y570 *	286THFNA8028	28	\$3,794	E3					
Y571 *	324THFPA8028	28	\$4,913	E3					
Y572 *	326THFS8028	28	\$6,078	E3					
Y573 *	364THFS8036	28	\$7,834	E3					
Y574 *	365THFS8036	29	\$8,875	E3					
Y575 *	405THFS8036	29	\$12,009	E3					
Y576 *	444THFN8036	29	\$15,805	E3					
Y577 *	445THFN8036	29	\$18,248	E3					
Y578 *	445THFN8040	29	\$22,027	E3					
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Y580	449THFS8037	29	\$31,240	E3					
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Y583 *	324THFPA8086	28	\$8,141	E3					
Y584 *	326THFPA8086	28	\$8,956	E3					
Y585 *	364THFS8391	28	\$10,804	E3					
Y586 *	365THFS8380	28	\$12,951	E3					
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Y588 *	405THFS8378	29	\$17,505	E3					
Y589 *	444THFN8384	29	\$20,092	E3					
Y590 *	145THTN8037	28	\$943	E3					
Y592 *	56H17T2001	22	\$349	E3					
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Y603	56H17E5304	25	\$728	E3					
Y604 *	56H17E5305	25	\$797	E3					
Y605 *	56H17T2021	18	\$220	E3					
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Y978 *	143THEN8034	35	\$5,435	E3					
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Y988 *	182THTS8048	37	\$2,473	E3					
Y989 *	184THTS8056	37	\$2,981	E3					
Y990 *	213THTS8071	37	\$3,736	E3					
Y991 *	215THTS8071	37	\$4,440	E3					
Y992	254THTNA8071	37	\$5,642	E3					
Y993 *	256THTNA8071	37	\$7,478	E3					
Y994 *	213THFW7726	18	\$1,237	E3					
Y995	213THFW7736	18	\$1,237	E3					
Y996 *	215THFW7726	18	\$1,582	E3					
Y997	215THFW7736	18	\$1,582	E3					
Y998	182THFR7726	18	\$850	E3					
Y999 *	182THFR7729	18	\$850	E3					

\* Stock Model

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# Marathon Electric Manufacturing Corporation

## MPN411 Terms and Conditions of Sale

**ALL QUOTATIONS ARE MADE AND ALL ORDERS ARE ACCEPTED BY MARATHON ELECTRIC MANUFACTURING CORPORATION SUBJECT ONLY TO THESE TERMS AND CONDITIONS.**

### 1. MODIFICATIONS OF SALES TERMS

Any Terms and Conditions contained in any purchase order or other form of communication from Marathon's customers which are additional to or different from these Terms and Conditions shall be deemed rejected by Marathon unless expressly accepted in writing by Marathon. In general, no modification, amendment, waiver or other change of any of these Terms and Conditions and those contained on the reverse side hereof and/or in attachments hereto ("Terms and Conditions"), or of any of Marathon's rights or remedies thereunder, shall be binding on Marathon unless expressly accepted in writing by Marathon's authorized officers. No course of dealing, usage of trade or course of performance shall be relevant to explain or supplement any of these Terms and Conditions. In case of conflict between the Terms and Conditions printed on this page and those contained on the face side or in attachments hereto, the latter shall control. If any document issued by any party hereto is sent by facsimile or another form of electronic document transmission, the parties hereto agree that (a) the copy of any such document printed on the facsimile machine or printer of the recipient thereof is a counterpart original copy thereof and is a "writing", (b) delivery of any such document to the recipient thereof by facsimile or such other form of electronic document transmission is authorized by the recipient thereof and is legally sufficient for all purposes as if delivered by United States mail, (c) the typewritten name of an authorized agent of the party sending such document on any such document is sufficient as a signature thereon and behalf of such party and the intent of such signature is to authenticate the writing, and (d) an electronically stored and reproduced copy of any such document shall be deemed to be legally sufficient evidence of the terms of such document for all purposes.

### 2. ACCEPTANCE OF ORDERS

Acceptance by Marathon of Buyer's purchase order(s) is expressly conditioned upon Buyer's assent to these Terms and Conditions. Buyer will be deemed to have assented to such Terms and Conditions unless Marathon receives written notice of any objections within fifteen (15) days after Buyer's receipt of this form and in all events prior to any delivery or other performance by Marathon of Buyer's order.

### 3. QUOTATIONS

Quotations by Marathon shall be deemed to be offers by Marathon to sell the equipment described therein subject to these Terms and Conditions, and acceptance of such offers is expressly limited to acceptance by Buyer of all of these Terms and Conditions within thirty (30) days from the date of the quotation. Purchase orders submitted by Buyer for the equipment quoted by Marathon shall be subject to and will be deemed to constitute acceptance of these Terms and Conditions. All purchase orders will be subject to approval by Marathon.

### 4. PRICES; PRICE CHANGES

All prices are net F.O.B. shipping point and are subject to change without notice. In the event of a change in Marathon's prices, the price for equipment unshipped will be the price in effect on the date of shipment.

If Marathon's quoted price was based upon delivery to and acceptance by Buyer of a specified quantity of equipment, such price shall be subject to adjustment if Buyer does not accept the quantity at the times specified in Marathon's quotation, and Buyer will be invoiced at Marathon's standard price without quantity discounts, if any, for the quantity of equipment actually accepted by Buyer.

### 5. TAXES

In addition to any prices, Buyer shall pay the amount of any present or future manufacturer's tax, retailer's occupation tax, use tax, sales tax, excise tax, duty, custom, inspection or testing fee, or any other tax, fee or charge of any nature whatsoever imposed by any governmental authority, on or measured by the transaction between Marathon and Buyer. In the event Marathon is required to pay any such tax, fee or charge, Buyer shall reimburse Marathon therefor; or, in lieu of such payment, Buyer shall provide Marathon at the time the order is submitted with an exemption certificate or other document acceptable to the authority imposing such tax, fee or charge.

### 6. TERMS OF PAYMENT

All orders are subject to the approval of Marathon. Terms of payment are cash in full no later than thirty (30) days from date of shipment, without discount. If, during the period of performance of an order, the financial condition of Buyer is determined by Marathon not to justify the terms of payment specified, Marathon may demand full or partial payment in advance before proceeding with the work, or satisfactory security or guarantees that invoices will be promptly paid when due, or, at its option without prejudice to other lawful remedies, may defer delivery or cancel this contract. If delivery is deferred, the equipment may be stored as provided in Section 9 hereof and Marathon may submit a new estimate of cost for completion based on prevailing conditions. If Buyer defaults in any payment when due, or in the event any voluntary or involuntary bankruptcy or insolvency proceedings involving Buyer are initiated by or against Buyer, then the whole contract price shall immediately become due and payable upon demand, or Marathon, at its option without prejudice to its other lawful remedies, may defer delivery or cancel this contract.

Prorata payments shall become due as shipments are made. If shipments are delayed by the Buyer for any cause, payments shall become due from the date on which Marathon is prepared to make shipment and storage shall be the Buyer's risk and expense as provided in Section 9 hereof. If manufacture is delayed by the Buyer for any cause, a partial payment based upon the proportion of the order completed shall become due from the date on which Marathon is notified of the delay.

### 7. DELIVERY; RISK OF LOSS

All sales are F.O.B. Marathon's plant or other point of shipment designated by Marathon. Shipping dates are estimates only which are not guaranteed and are based upon prompt receipt from Buyer of all necessary shipping and other information. Marathon reserves the right to make delivery in installments, all installments to be separately invoiced and paid for by Buyer when due per invoice, without regard to subsequent deliveries.

Delivery of equipment to a commercial carrier at Marathon's plant or other loading point shall constitute delivery to Buyer, and any risk of loss and further cost and responsibility thereafter for claims, delivery, loss or damage, including, if applicable,

# Marathon Electric Manufacturing Corporation

## MPN411 Terms and Conditions of Sale

placement and storage, shall be borne by Buyer. When equipment is delivered by Marathon's truck, unloading at Buyer's dock shall constitute delivery to Buyer. Claims for shortages or other errors in delivery must be made in writing to Marathon within ten (10) days after receipt of shipment and failure to give such notice shall constitute unqualified acceptance and a waiver of all such claims by Buyer. Claims for loss or damage to equipment in transit by common carrier must be made to the carrier and not to Marathon.

Freight and handling charges by Marathon may not reflect actual freight charges prepaid to the carrier by Marathon due to incentive discounts earned by Marathon based upon Marathon's aggregate volume of freight tendered to a carrier or when a carrier must be used which charges a rate which is different than the rate upon which Marathon's freight and handling charges were based. When shipments are delivered in Marathon's private trucks, Buyer will be charged an amount approximating the prevailing common carrier rate.

### 8. EXCUSABLE DELAYS; FORCE MAJEURE

Marathon shall not be liable for any ordinary, incidental, or consequential loss or damage as a result of Marathon's delay in or failure of delivery or installation due to (i) any cause beyond Marathon's reasonable control, (ii) an act of God, act of the Buyer, embargo or other government act, authority, regulation or request, fire, theft, accident, strike, slowdown or other labor disturbance, war, riot, delay in transportation, or (iii) inability to obtain necessary labor, materials, components, or facilities.

Should any of the aforementioned events of force majeure occur, Marathon, at its option, may cancel Buyer's order with respect to any undelivered equipment or extend the delivery date for a period equal to the time lost because of delay. Notice of such election shall be given promptly to Buyer. In the event Marathon elects to so cancel the order, Marathon shall be released of and from all liability for failure to deliver the equipment, including, but not limited to, any and all claims on behalf of Buyer for lost profits, or any other claim of any nature which Buyer might have.

If shipping or progress of the work is delayed or interrupted by Buyer, directly or indirectly, Buyer shall pay Marathon for all additional charges resulting therefrom.

### 9. STORAGE

If the equipment is not shipped within thirty (30) days after notification has been made to Buyer that it is ready for shipping, for any reason beyond Marathon's control, including Buyer's failure to give shipping instructions, Marathon may store the equipment at Buyer's risk and expense in a warehouse or on Marathon's premises, and Buyer shall pay all handling, transportation and storage costs at the prevailing commercial rates promptly following Marathon's submission of invoices for such costs.

### 10. WARRANTIES TO DISTRIBUTORS AND INDUSTRIAL OR COMMERCIAL CUSTOMERS

This warranty is extended only to Marathon's distributors and industrial or commercial customers and does not apply to consumer purchasers.

**Warranty Period** - (a) Marathon warrants the Fractional motors and Integral motors manufactured by or for it to be free from defects in materials and workmanship and to conform to Marathon's written specifications for a period of 12 months from date of first use, 18 months from date of manufacture, whichever period shall expire first. (b) Marathon warrants special products, as listed below, to be free from defects in materials and workmanship and to conform to Marathon's written specifications.

- Blue Chip® Severe Duty Explosion Proof and EAct compliant motors, 24 months from date of first use, 30 months from date of manufacture, whichever period shall expire first.
- Blue Max®, Black Max®, microMAX™ Inverter Duty motors and all XRI® motors, 36 months from date of first use, 42 months from date of manufacture, whichever period shall expire first.
- U-Frame Automotive Duty and IEEE-841 motors, 60 months from date of first use, 66 months from date of manufacture, whichever period shall expire first.

**Warranty Remedies** - If, prior to expiration of the foregoing applicable warranty period, any of such products shall be proved to Marathon's satisfaction to be defective or nonconforming, Marathon will repair or replace such defective equipment or components thereof, F.O.B. Marathon's plant or other destination designated by Marathon, or will refund or provide Buyer with a credit in the amount of the purchase price paid therefor by Buyer, at Marathon's sole option. Buyer's exclusive remedy and Marathon's sole obligation under this warranty shall be limited to such repair or replacement, F.O.B. Marathon's plant or other destination designated by Marathon, or refund or credit by Marathon, and shall be conditioned upon Marathon's receiving written notice of any defect within a reasonable period of time (but in no event more than sixty (60) days) after it was discovered or by reasonable care should have been discovered. In no event shall Marathon's liability for such defective or nonconforming products exceed the purchase price paid by Buyer therefor.

**Exclusions** - This warranty does not (i) cover shipping expenses to and from Marathon's factory or other destination designated by Marathon for repair or replacement of defective equipment or any tax, duty, custom, inspection or testing fee, or any other charge of any nature related thereto, nor does it cover the costs of disassembling or removing defective equipment or reassembling, reinstalling, or testing repaired or replaced equipment or finishing the reinstallation thereof, (ii) apply and shall be void with respect to equipment operated in excess of rated capacity or otherwise not in accordance with installation, maintenance, or operating instructions or requirements, to equipment repaired or altered by others than Marathon or Marathon's authorized service agencies, or to equipment which was subjected to abuse, negligence, misuse, misapplication, accident, damages by circumstances beyond Marathon's control, to improper installation (if by others than Marathon), operation, maintenance or storage, or to other than normal use or service, and (iii) apply to equipment or components not manufactured by or for Marathon. With respect to equipment or components not manufactured by Marathon, Marathon's warranty obligations shall in all respects conform and be limited to the warranty actually extended to Marathon by its suppliers, but in no event shall Marathon's obligations be greater than those provided under Marathon's warranty set forth in this Section 10.

**THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES (EXCEPT TITLE), INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NO EMPLOYEE, REPRESENTATIVE, OR AGENT OF MARATHON OTHER THAN AN OFFICER OF MARATHON IS AUTHORIZED TO ALTER OR MODIFY ANY PROVISION OF THIS SECTION 10 OR TO MAKE ANY GUARANTEE, WARRANTY, OR REPRESENTATION, EXPRESS OR IMPLIED, ORALLY OR IN WRITING, WHICH IS CONTRARY TO THE FOREGOING.** Any description of the equipment, whether in writing or made orally by Marathon or Marathon's agents, specifications, samples, models, bulletins, drawings, diagrams, engineering sheets or similar materials used in connection with Buyer's order are for the sole purpose of identifying the equipment and shall not be construed as an express warranty. Any suggestions by Marathon or Marathon's agents regarding use, application or suitability of the equipment shall not be construed as an express warranty unless confirmed to be such in writing by Marathon's authorized officer.

### **11. LIMITATIONS OF LIABILITY; CONSEQUENTIAL DAMAGES**

**Nuclear Use Disclaimer** - Equipment sold by Marathon is not intended for use in connection with any nuclear facility or activity. If so used, Marathon disclaims all liability for any nuclear damage, injury or contamination, and Buyer shall indemnify and hold Marathon, its officers, agents, employees, successors, assigns and customers harmless from and against any and all losses, damages or expenses of whatever form or nature (including attorneys' fees and other costs of defending any action) which they or any of them may sustain or incur, whether as a result of breach of contract, warranty, tort (including negligence) or otherwise, by reason of such use.

**Consequential Damage Disclaimer** - Marathon's liability with respect to equipment proved to its satisfaction to be defective within the warranty period shall be limited to repair, replacement or refund as provided in Section 10 hereof, and in no event shall Marathon's liability exceed the purchase price of the equipment involved. Marathon shall not be subject to any other obligations or liabilities, whether arising out of breach of contract, warranty, tort (including negligence) or other theories of law, with respect to equipment sold or services rendered by Marathon, or any undertakings, acts or omissions relating thereto. Without limiting the generality of the foregoing, Marathon specifically disclaims any liability for property or personal injury damages, penalties, special or punitive damages, damages for lost profits or revenues, loss of use of equipment or any associated equipment, cost of capital, cost of substitute products, facilities or services, downtime, shutdown, or slowdown costs, or for any other types of economic loss, and for claims of Buyer's customers for any such damages.

**MARATHON SHALL NOT BE LIABLE FOR AND DISCLAIMS ALL CONSEQUENTIAL, INCIDENTAL AND CONTINGENT DAMAGES WHATSOEVER. EVEN IF THE REPAIR OR REPLACEMENT REMEDY SHALL BE DEEMED TO HAVE FAILED OF ITS ESSENTIAL PURPOSE UNDER SECTION 2-719 OF THE UNIFORM COMMERCIAL CODE, MARATHON SHALL HAVE NO LIABILITY TO BUYER FOR CONSEQUENTIAL DAMAGES, SUCH AS LOST PROFITS, LOST REVENUE, DAMAGE TO**

**OTHER EQUIPMENT OR LIABILITY OR INJURY TO A THIRD PARTY.**

### **12. INDEMNIFICATION BY BUYER**

Buyer shall indemnify, hold harmless, and defend Marathon and Marathon's employees and agents from and against any and all damages, liability, claims, losses, and expenses (including reasonable attorneys' fees, court costs, and out-of-pocket expenses) arising out of or resulting in any way from claims by customers of Buyer or third parties against Marathon alleging a breach of contract or warranty by Marathon to the extent that such damages, liability, claims, losses, and expenses which may be payable by Marathon to Buyer pursuant to and as limited by Marathon's warranty and damage obligations as contained in Sections 10 and 11 hereof so as to effectively limit Marathon's obligations to customers of Buyer or third parties to those set forth in Sections 10 and 11 hereof.

### **13. PATENT INDEMNIFICATION**

Marathon will, at its own expense, defend or settle any suits that may be instituted against Buyer for alleged infringement by the equipment of any United States patent, provided that (a) such alleged infringements consist of the use of the equipment for any of the purposes for which such equipment was sold, (b) Buyer shall have made all payments for such equipment then due hereunder, (c) Buyer shall give Marathon immediate notice in writing of any such suit and transmit to Marathon immediately upon receipt all processes and papers served upon Buyer, and (d) Buyer shall permit Marathon through its counsel, either in the name of Buyer or in the name of Marathon, to defend such suit(s) and give all needed information, assistance and authority to enable Marathon to do so.

In case of a final award of damages in any such suit, Marathon will pay such award but will not be responsible for any compromise or settlement made without its written consent. In case the equipment itself is in such suit held to infringe any valid patent issued in the United States and its use enjoined, or in the event of a settlement or compromise approved by Marathon which shall preclude future use of the equipment sold to Buyer hereunder, Marathon shall, at its own expense and at its sole option, either (a) procure rights to continue using such equipment, (b) modify the equipment to render it non-infringing, (c) replace the equipment with non-infringing equipment or (d) refund the purchase price paid by Buyer for the equipment after return of the equipment to Marathon. Notwithstanding the foregoing, Marathon shall not be held responsible for infringements of combination or process patents covering the use of equipment in combination with other goods or materials not furnished by Marathon.

The foregoing states the entire liability of Marathon for patent infringement, and **IN NO EVENT SHALL MARATHON BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES ATTRIBUTABLE TO AN INFRINGEMENT** nor for infringement based on the use of the equipment for a purpose other than that for which sold by Marathon. As to any equipment furnished by Marathon to Buyer manufactured in accordance with designs proposed or furnished by Buyer or any claim of contributory infringement resulting from the use or resale by Buyer of equipment sold hereunder, Buyer shall indemnify Marathon for any award made against Marathon or settlement by Marathon for any patent, trademark or copyright infringements, including attorneys' fees and defense costs.

# Marathon Electric Manufacturing Corporation

## MPN411 Terms and Conditions of Sale

### 14. SECURITY AGREEMENT AND FINANCING STATEMENTS

To secure payment of the purchase price and of all monies which may be due hereunder, and performance of all of Buyer's obligations hereunder, Buyer hereby grants to Marathon a security interest in all equipment sold by Marathon, and agrees to execute such other Security Agreements and Financing Statements as Marathon may reasonably request.

### 15. INSURANCE

Until payment in full of the purchase price, Buyer shall maintain insurance covering all equipment sold by Marathon to Buyer in such amounts and against such risks as is customary by companies engaged in the same or similar business and similarly located, and shall, upon Marathon's request, furnish evidence of such insurance satisfactory to Marathon.

### 16. DRAWINGS; OTHER DESIGN DATA

All specifications, drawings, designs, data, information, ideas, methods, tools, gages, dies, fixtures, patterns and/or inventions made, conceived, developed or acquired by Marathon in connection with procuring and/or executing Buyer's order will vest in and inure to Marathon's sole benefit notwithstanding any changes therefor which may have been or may be imposed by Marathon.

Buyer shall not give, loan, exhibit, sell or transfer to any person not then employed by Buyer and authorized to receive such information, or to any organization or entity, any drawing, photograph or specification furnished by Marathon or reproduction thereof which may enable such person, organization or entity to furnish similar goods or parts therefor.

### 17. RETURN OF EQUIPMENT

No equipment or part shall be returned to Marathon without written authorization and shipping instructions first having been obtained from Marathon.

### 18. ASSIGNMENT AND SUBCONTRACTING

None of the Buyer's rights under any order shall be assigned by the Buyer to any other person, whether by operation of law or otherwise, without Marathon's prior written approval. Marathon may, without the necessity of obtaining Buyer's prior written consent, subcontract the production of all or any portion of the equipment.

### 19. CANCELLATION

No order submitted to Marathon may be cancelled by Buyer without the prior written consent of Marathon, which consent will at all times be conditioned on Buyer's agreement to pay Marathon's cancellation charge. For finished equipment which in Marathon's judgment is readily resalable to others, the cancellation charge shall be 15% of the invoice price of the equipment. For all other cancellations, the cancellation charge shall amount to all costs and expenses incurred by Marathon and arising out of or in connection with Buyer's order, net of recoverability, but in no event less than 10% of the invoice price of the equipment or more than the invoice price.

### 20. GENERAL

**Governing Law** - These Terms and Conditions, and the contract of sale between Marathon and Buyer, shall be governed by and construed in accordance with the laws of the State of Wisconsin. Marathon and Buyer hereby agree that any legal action deemed necessary by either party hereto shall be brought in the Circuit Court in and for Marathon County, Wisconsin and hereby consent to the personal jurisdiction of such court in any such action over the parties hereto. The rights and obligations of Marathon and Buyer shall not be governed by the provisions of the United Nations Convention on Contracts for the International Sale of Goods.

**Attorneys' Fees** - Buyer agrees to pay all of Marathon's costs and expenses of collection and related litigation, including but not limited to attorneys' fees and costs.

**Salvatory Clause** - The invalidity, in whole or in part, of any of the provisions of these Terms and Conditions, shall not affect the enforceability of any of the other provisions thereof.

**Applicability** - The Terms and Conditions as stated herein are applicable as of the date of this printing and until such time as changed by Marathon.

Revised, January 2004





# IMPORTANT INFORMATION



## Please Read Carefully

This catalog is not intended to provide operational instructions. Appropriate Marathon Electric instructions provided with the motor and precautions attached to the motor should be read carefully prior to installation, operation and/or maintenance of the equipment. Injury to personnel or motor failure may be caused by improper installation, maintenance or operation.

**The following  and  information is supplied to you for your protection and to provide you with many years of trouble free and safe operation of your Marathon Electric product:**



- Disconnect power and lock out driven equipment before working on a motor.
- Always keep hands and clothing away from moving parts.
- The lifting support on the motor is not to be used to lift the entire machine. Only the motor attached directly to the support may be safely lifted by the support.
- Install and ground per local and national codes.
- Discharge all capacitors before servicing a single phase motor.
- Misapplication of a motor in a hazardous environment can cause fire or an explosion and result in serious injury. Only the end user, local authority having jurisdiction, and/or insurance underwriter are qualified to identify the appropriate class(es), group(s), division and temperature code. Marathon Electric personnel can not evaluate or recommend what motors may be suitable for use in hazardous environments. If a motor is nameplated for hazardous locations, do not operate the motor without all of the grease and drain plugs installed.
- Never attempt to measure the temperature rise of a motor by touch. Temperature rise must be measured by thermometer, resistance, imbedded detector or thermocouple.
- Motors with automatic reset thermal protectors will automatically restart when the protector temperature drops sufficiently. Do not use motors with automatic reset thermal protectors in applications where automatic restart will be hazardous to personnel or equipment.
- Motors with manual reset thermal protectors may start unexpectedly after the protector trips when the surrounding air is at +20°Fahrenheit or lower. If the manual reset protector trips, disconnect motor from its power supply. After the protector cools (five minutes or more), it can be reset and power may be applied to the motor.
- Connect all protective device leads, marked P1, P2, etc., per instructions supplied with the motor.
- Operation of a motor at other than its nameplate rating may result in fire, damage to equipment or serious injury to personnel.
- For safety, Buyer or User should provide protective guards over all shaft extensions and any moving apparatus mounted thereon. The User is responsible for checking all applicable safety codes in his area and providing suitable guards. Failure to do so may result in bodily injury and/or damage to equipment.



- Consult qualified personnel with questions and all electrical repairs must be performed by trained and qualified personnel only.
- For motors nameplated as “belted duty only”, do not operate the motor without belts properly installed.
- Motors and/or driven equipment should not be operated faster than their rated speed.
- For inverter applications, follow the inverter manufacturer’s installation guidelines.
- Make sure the motor is properly secured and aligned before operation.

# Important Information

## Resale of Goods

In the event of the resale of any of the goods, in whatever form, Resellers/Buyers will include the following language in a conspicuous place and in a conspicuous manner in a written agreement covering such sale:

The manufacturer makes no warranty or representations, express or implied, by operation of law or otherwise, as to the merchantability or fitness for a particular purpose of the goods sold hereunder. Buyer acknowledges that it alone has determined that the goods purchased hereunder will suitably meet the requirements of their intended use. In no event will the manufacturer be liable for consequential, incidental or other damages. Even if the repair or replacement remedy shall be deemed to have failed of its essential purpose under Section 2-719 of the Uniform Commercial Code, the manufacturer shall have no liability to Buyer for consequential damages.

Resellers/Buyers agree to also include this entire document including the warnings and cautions above in a conspicuous place and in a conspicuous manner in writing to instruct users on the safe usage of the product.

This information should be read together with all other printed information supplied by Marathon Electric.

For more information contact: **Marathon Electric Manufacturing Corporation**, Subsidiary of Regal-Beloit Corporation, 100 E. Randolph St., Wausau, WI 54401 Phone: 715-675-3311 or Fax: 715-675-8030.

# The Blue Chip® Motor Group:

**Motors for the Long Run!**

Specifications	Features	Blue Chip®	XRI®	XRI®-SD	XRI®-841
Enclosures	143-145T frame TENV ▪ 182T-449T frame TEFC	✓	✓	✓	✓
Construction	Cast iron frames and end shields	✓	✓	✓	✓
Fan (External)	Non-sparking polypropylene Non-sparking polypropylene 364T-449T	✓	✓	✓	✓
Fan Guard	Cast iron Polypropylene 182T-286T ▪ Cast iron 324T-449T	✓	✓	✓	✓
Conduit Box	Steel 143T-326T ▪ Cast iron 364T-449T Cast iron, oversized, fully gasketed with NPT threaded opening	✓	✓	✓	✓
Bearings & Lubrication	Shielded ball bearings ▪ Select ratings above 125 HP have roller bearing on drive-end ▪ C-3 fit with premium Mobil Polyrex EM grease (-30°C to +150°C) Zerk fittings Extended grease tubes for regreasing without disassembly	✓	✓	✓	✓
Bearing Caps	Cast iron, 254T-449T frame Cast iron, 444T-449T frame	✓	✓	✓	✓
Drains	Corrosion resistant brass drain and breather Drilled and tapped hole Drain hole 143T-326T ▪ Drilled and tapped hole 364T-449T	✓	✓	✓	✓
Slinger	Molded neoprene slinger on shaft end	✓	✓	✓	✓
Voltage	230/460 volt through 100 HP ▪ 460 volt - 125 HP & above 575 volt available ▪ 230/460 volt available 460 volt or 575 volt, 3 leads	✓	✓	✓	✓
Leads	Lead lugs standard 364T frame and larger Permanently marked leads with lead separator	✓	✓	✓	✓
Service Factor (Sine Wave)	1.15 1.25 (through 40 HP)	✓	✓	✓	✓
Insulation	Non-hygroscopic class F insulation ▪ 449T class H insulation MAX GUARD®	✓	✓	✓	✓
Inverter Duty	Rated for 10:1 VT or 20:1 CT VFD Nameplated for 10:1 VT, 2:1 CT or 10:1 CT VFD	✓	✓	✓	✓
Nameplate	Stainless steel - includes NEMA nom. eff., power factor AFBMA bearing identification plate	✓	✓	✓	✓
Marine Duty	Meets IEEE45 and USCG Meets API RP14F for offshore platforms	✓	✓	✓	✓
Agency Listings	UL recognized file no. E49747 and CSA certified	✓	✓	✓	✓
Division 2	CSA certification nameplate, Class I Groups A, B, C, & D, Temperature code: T2B	✓	✓	✓	✓
Seals	Inpro/Seal® VBX® Bearing Isolators on drive end of TENV and on both ends of TEFC	✓	✓	✓	✓
Epoxy Finish	Internal and external corrosion resistant epoxy	✓	✓	✓	✓
Hardware	Corrosion resistant zinc dichromate plated hex head hardware ▪ Lifting provisions, 182T-449T frame	✓	✓	✓	✓
Ground	Ground lug provision in conduit box External grounding provision	✓	✓	✓	✓
Balance	Special balance average .03 in/sec	✓	✓	✓	✓
Warranty	24 mo. from date of first use.,30 mo. from date of manufacture 36 mo. from date of first use.,42 mo. from date of manufacture 60 mo. from date of first use.,66 mo. from date of manufacture Optional extended warranty	✓	✓	✓	✓
Motor Testing	Actual short commercial test data supplied with each motor Actual short commercial test data plus max. vibration test supplied with each motor Actual short commercial test data plus 2 additional vibration tests are supplied with each motor	✓	✓	✓	✓



**Blue Chip®**  
Meets EPACT and Canadian NRCAN



**Blue Chip® XRI® - Ultra High**  
★ Meets NEMA Premium® Levels



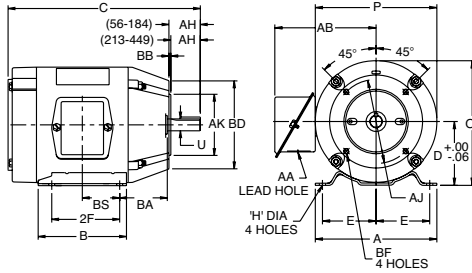
**Blue Chip® XRI® - Severe Duty**  
★ Meets NEMA Premium® Levels



**Blue Chip® XRI®-841**  
Meets IEEE 841 Motor Specifications  
★ Meets NEMA Premium® Levels

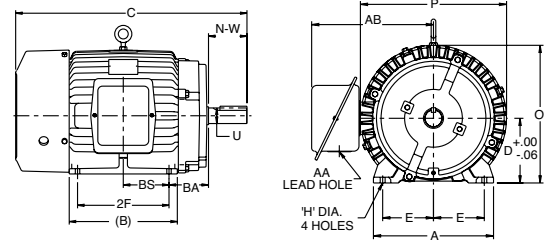
# NEMA Quick Reference Dimensional Chart

## Typical C-Face Motor



NEMA C-Face	BA Dimensions
143-5TC	2-3/4
182-4TC	3-1/2
213-5TC	4-1/4
254-6TC	4-3/4

## Typical Rigid Base Motor



Contact your Marathon Electric sales representative for "AB", "O", & "P" Dimensions.

Refer to your Marathon Electric catalog for "C" Dimensions.

FRAME	D	E	2F	H	U	N-W	AA	AH	AJ	AK	BA	BB (MIN)	BD (MAX)	BF
48	3.00	2.12	2.75	.34 SLOT	.500	1.50	1/2	1.69	3.750	3.000	2.50	.13	5.62	1/4-20
56	3.50	2.44	3.00	.34 SLOT	.625	1.88	1/2	2.06	5.875	4.500	2.75	.13	6.50	3/8-16
56H	3.50	2.44	5.00	.34 SLOT	.625	1.88	1/2	2.06	5.875	4.500	2.75	.13	6.50	3/8-16
143T	3.50	2.75	4.00	.34	.875	2.25	3/4	2.12	5.875	4.500	2.25	.13	6.50	3/8-16
145T	3.50	2.75	5.00	.34	.875	2.25	3/4	2.12	5.875	4.500	2.25	.13	6.50	3/8-16
182	4.50	3.75	4.50	.41	.875	2.25	3/4	2.12	5.875	4.500	2.75	.13	6.50	3/8-16
184	4.50	3.75	5.50	.41	.875	2.25	3/4	2.12	5.875	4.500	2.75	.13	6.50	3/8-16
182T	4.50	3.75	4.50	.41	1.125	2.75	3/4	2.62	7.250	8.500	2.75	.25	9.00	1/2-13
184T	4.50	3.75	5.50	.41	1.125	2.75	3/4	2.62	7.250	8.500	2.75	.25	9.00	1/2-13
213	5.25	4.25	5.50	.41	1.125	3.00	1	2.75	7.250	8.500	3.50	.25	9.00	1/2-13
215	5.25	4.25	7.00	.41	1.125	3.00	1	2.75	7.250	8.500	3.50	.25	9.00	1/2-13
213T	5.25	4.25	5.50	.41	1.375	3.38	1	3.12	7.250	8.500	3.50	.25	9.00	1/2-13
215T	5.25	4.25	7.00	.41	1.375	3.38	1	3.12	7.250	8.500	3.50	.25	9.00	1/2-13
254U	6.25	5.00	8.25	.53	1.375	3.75	1-1/4	3.50	7.250	8.500	4.25	.25	10.00	1/2-13
256U	6.25	5.00	10.00	.53	1.375	3.75	1-1/4	3.50	7.250	8.500	4.25	.25	10.00	1/2-13
254T	6.25	5.00	8.25	.53	1.625	4.00	1-1/4	3.75	7.250	8.500	4.25	.25	10.00	1/2-13
256T	6.25	5.00	10.00	.53	1.625	4.00	1-1/4	3.75	7.250	8.500	4.25	.25	10.00	1/2-13
284U	7.00	5.50	9.50	.53	1.625	4.88	1-1/2	4.62	9.000	10.500	4.75	.25	11.25	1/2-13
286U	7.00	5.50	11.00	.53	1.625	4.88	1-1/2	4.62	9.000	10.500	4.75	.25	11.25	1/2-13
284T	7.00	5.50	9.50	.53	1.875	4.62	1-1/2	4.38	9.000	10.500	4.75	.25	11.25	1/2-13
286T	7.00	5.50	11.00	.53	1.875	4.62	1-1/2	4.38	9.000	10.500	4.75	.25	11.25	1/2-13
284TS	7.00	5.50	9.50	.53	1.625	3.25	1-1/2	3.00	9.000	10.500	4.75	.25	11.25	1/2-13
286TS	7.00	5.50	11.00	.53	1.625	3.25	1-1/2	3.00	9.000	10.500	4.75	.25	11.25	1/2-13
324U	8.00	6.25	10.50	.66	1.875	5.62	2	5.38	11.000	12.500	5.25	.25	14.00	5/8-11
326U	8.00	6.25	12.00	.66	1.875	5.62	2	5.38	11.000	12.500	5.25	.25	14.00	5/8-11
324T	8.00	6.25	10.50	.66	2.125	5.25	2	5.00	11.000	12.500	5.25	.25	14.00	5/8-11
326T	8.00	6.25	12.00	.66	2.125	5.25	2	5.00	11.000	12.500	5.25	.25	14.00	5/8-11
324TS	8.00	6.25	10.50	.66	1.875	3.75	2	3.50	11.000	12.500	5.25	.25	14.00	5/8-11
326TS	8.00	6.25	12.00	.66	1.875	3.75	2	3.50	11.000	12.500	5.25	.25	14.00	5/8-11
364U	9.00	7.00	11.25	.66	2.125	6.38	2-1/2	6.12	11.000	12.500	5.88	.25	14.00	5/8-11
365U	9.00	7.00	12.25	.66	2.125	6.38	2-1/2	6.12	11.000	12.500	5.88	.25	14.00	5/8-11
364T	9.00	7.00	11.25	.66	2.375	5.88	2-1/2	5.62	11.000	12.500	5.88	.25	14.00	5/8-11
365T	9.00	7.00	12.25	.66	2.375	5.88	2-1/2	5.62	11.000	12.500	5.88	.25	14.00	5/8-11
364TS	9.00	7.00	11.25	.66	1.875	3.75	2-1/2	3.50	11.000	12.500	5.88	.25	14.00	5/8-11
365TS	9.00	7.00	12.25	.66	1.875	3.75	2-1/2	3.50	11.000	12.500	5.88	.25	14.00	5/8-11
404U	10.00	8.00	12.25	.81	2.375	7.12	3	6.88	11.000	12.500	6.62	.25	15.50	5/8-11
405U	10.00	8.00	13.75	.81	2.375	7.12	3	6.88	11.000	12.500	6.62	.25	15.50	5/8-11
404T	10.00	8.00	12.25	.81	2.875	7.25	3	7.00	11.000	12.500	6.62	.25	15.50	5/8-11
405T	10.00	8.00	13.75	.81	2.875	7.25	3	7.00	11.000	12.500	6.62	.25	15.50	5/8-11
404TS	10.00	8.00	12.25	.81	2.125	4.25	3	4.00	11.000	12.500	6.62	.25	15.50	5/8-11
405TS	10.00	8.00	13.75	.81	2.125	4.25	3	4.00	11.000	12.500	6.62	.25	15.50	5/8-11
444U	11.00	9.00	14.50	.81	2.875	8.62	3	8.38	14.000	16.000	7.50	.25	18.00	5/8-11
445U	11.00	9.00	16.50	.81	2.875	8.62	3	8.38	14.000	16.000	7.50	.25	18.00	5/8-11
444T	11.00	9.00	14.50	.81	3.375	8.50	3	8.25	14.000	16.000	7.50	.25	18.00	5/8-11
445T	11.00	9.00	16.50	.81	3.375	8.50	3	8.25	14.000	16.000	7.50	.25	18.00	5/8-11
444TS	11.00	9.00	14.50	.81	2.375	4.75	3	4.50	14.000	16.000	7.50	.25	18.00	5/8-11
445TS	11.00	9.00	16.50	.81	2.375	4.75	3	4.50	14.000	16.000	7.50	.25	18.00	5/8-11
447T	11.00	9.00	20.00	.81	3.375	8.50	3	8.25	14.000	16.000	7.50	.25	18.00	5/8-11
449T	11.00	9.00	25.00	.81	3.375	8.50	3	8.25	14.000	16.000	7.50	.25	18.00	5/8-11
447TS	11.00	9.00	20.00	.81	2.375	4.75	4 NPT	4.50	14.000	16.000	7.50	.25	18.00	5/8-11
449TS	11.00	9.00	25.00	.81	2.375	4.75	4 NPT	4.50	14.000	16.000	7.50	.25	18.00	5/8-11



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