WOLONG

Power your future



Standard Industrial Motor Catalog

AC/DC, Up to 6000 HP / 4500 kW

WOLONG

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North American Manufacturing

We are committed to be a supplier of choice with superior service delivering the quality and reliability our customers demand.

Regional manufacturing with the fastest cycle times in the industry.
Robustly engineered GE and Wolong motors for severe-duty applications.
Highly experienced account managers and seasoned application engineers.
Extensive inventory and distribution network.

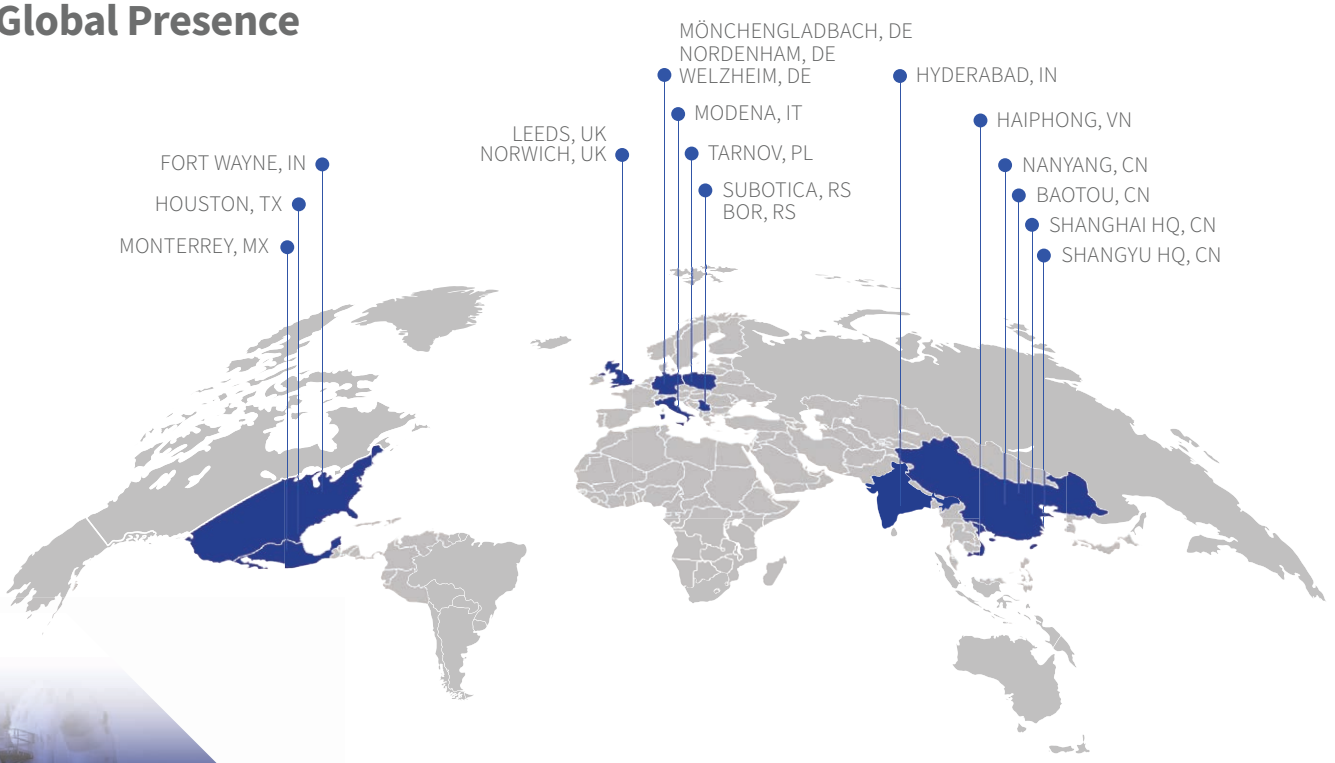
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Standard Industrial Motor Catalog

Our most recent product information .

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Application Considerations 06
Ferrite-Assisted SynR Motors - EMR-Bulldozer .....Section EMR
TEFC Severe Duty NEMA B Motors - Energy Saver SD ..... Section ES
NEMA Premium Efficient Extra Severe Duty Motors - XSD Ultra ..... Section XS
NEMA Design D High Slip Motors .....Section ND
Explosion Proof Premium Efficient Motors ..... Section XP
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High HP Low and Medium Voltage Motors .....Section MV
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Global Presence



Technology Experience & Brand History

2021 Emerging company offering Industrial IoT — imotorlinx

2013 Leading EPC for photovoltaic industry — POWER

1984 World's leading robotics solution provider — SIR ROBOTICS

1970 China's largest explosion-proof motor manufacturer

1961 International leader in industrial vibration technology — OLI

1940 Global leading spindle solutions provider — omlat

1919 Third largest motor manufacturer in Europe — ATB

1897 Best known coal mining motor manufacturer — MORLEY

1889 Leading manufacturer of AC and DC motors — GE INDUSTRIAL MOTORS

1883 Top manufacturer of offshore / nuclear power motors — LAURENCE SCOTT

1882 Leading provider of explosion-proof motors — SCHORCH

1878 Leading provider of energy efficient motors — BROOK CROMPTON

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Motor Engineering & Manufacturing

Footprint - over 35,000 m²
ISO 9001:2015 Certification
Quality Adherence - LRQA, CSA, NOM

Onsite Testing Facility

Footprint - 18,600 ft²
Standards - ABS, API, ATEX,
CSA, GOST, IEC, IEEE, NEMA,
Division I or II, and Zone 1, 2, or 22



Monterrey, Mexico Facility



Oil & Gas



Petroleum & Chemicals



Water & Wastewater



Mining & Minerals



Pulp & Paper



Metals

Frame agreements increase supply and specification efficiency unlocking resources.

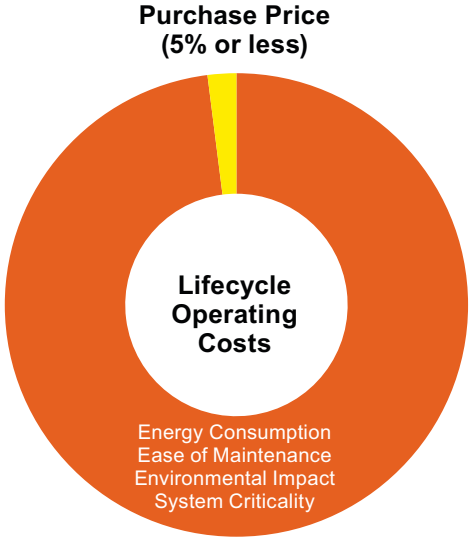
Less unplanned maintenance and downtime with more robust designs.

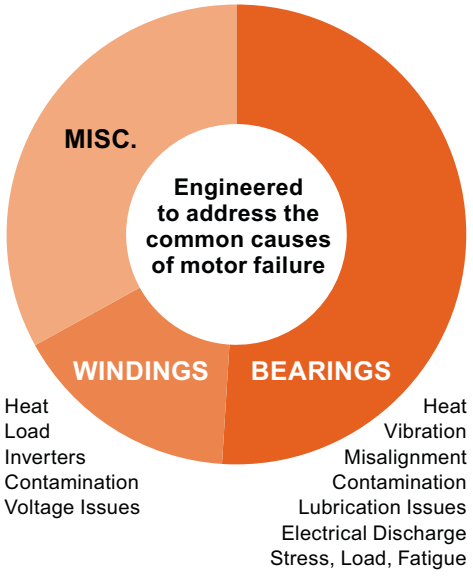
Premium, super, and ultra energy efficiency translate to faster savings for payback.

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CONSIDER LIFECYCLE OPERATING COSTS FIRST

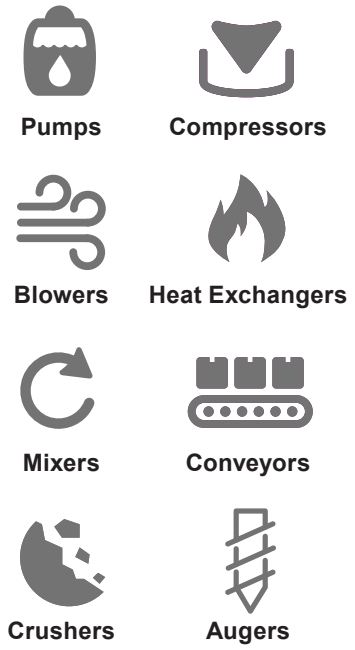
The initial cost of an electric motor makes up 5% or less of the total cost of operation. So all aspects of the motor operation should be considered when purchasing motors.





ENGINEERING REQUIREMENTS

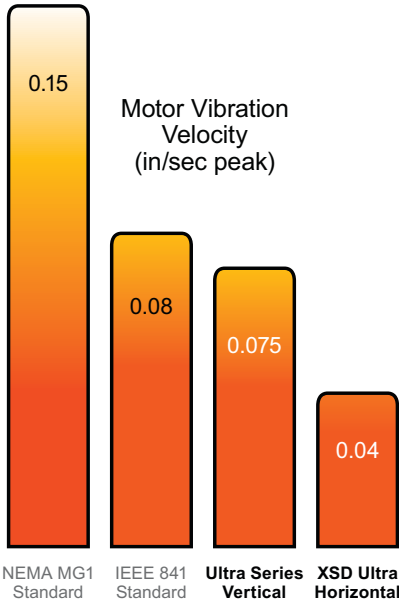
Each petroleum, chemical, power generation, pulp/paper, mining, metal, mineral, water/wastewater, and general process application has unique torque, speed, voltage, enclosure, temperature, and industry standard requirements that must be designed into motors.



We also have the expertise to diagnose the mechanical and electrical requirements for special applications and custom engineer designs as they warrant.

LOW VIBRATION MEANS LONG LIFE

Vibration is bad for motors and driven equipment. Motor bearings, in particular, begin to wear faster with high vibration levels. Beyond focusing on proper alignment, base, and voltage, users should also pay more attention to the design of the motor itself. In most cases, manufacturers are content to simply stay within the NEMA or IEEE standards because many engineers, of course, specify these limits.



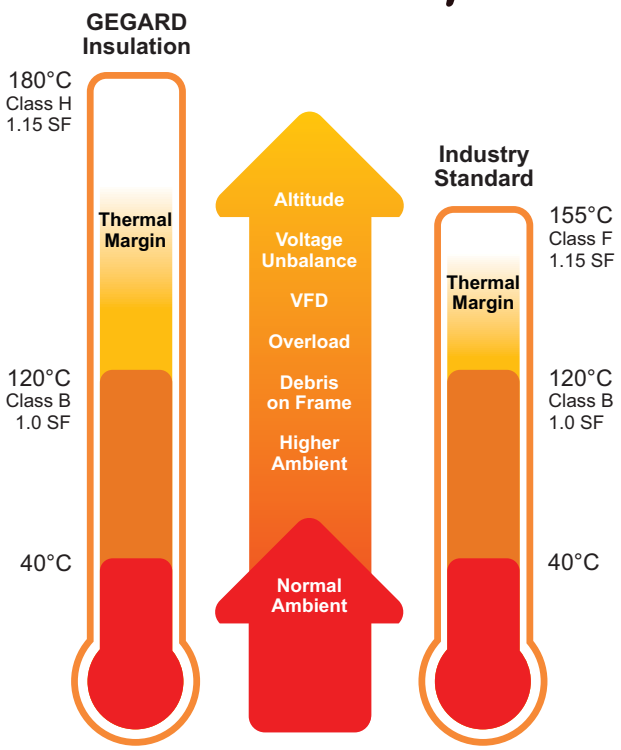
It is well documented that motors designed with low vibration have longer bearing life.

Since bearing wear is one of the leading causes of motor failure, reducing its chances reduces your unplanned downtime. Our application engineers have been told by many users that their driven equipment tends to run smoother with low vibration motors. All of this leads to lower maintenance costs on the entire drive system.

GEGARD™ INSULATION OFFERS ADDED PROTECTION IN SEVERE APPLICATIONS

Our Class H GEGARD insulation system is designed to excel in variable frequency drive applications where lesser designs often short circuit and cause overcurrent trips.

VFD READY
NEMA MG1 PART 31

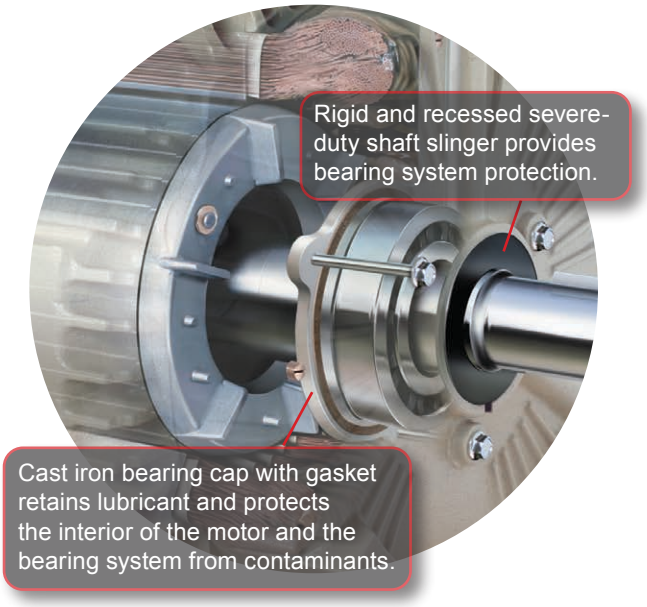


Larger Thermal Margin = Longer Motor Life

GUARDING AGAINST BEARING FAILURE

Common shaft currents create voltage spikes that reach bearings causing them to vibrate in operation. Over a short period, this vibration (fluting) will degrade bearings to the point of failure. We include bearing insulation for higher ratings and Aegis™ shaft grounding rings are optional on all ratings.







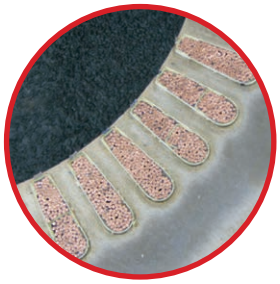
ROTATIONAL VARNISH APPLICATION

Motor coils are rotationally varnished with a “Trickle Treat” process while an electric current is passed through the windings to ensure a penetrating, thorough and even coating. This proven process fills air gaps that could cause corona inception damage during operation.



WIRE BONDING

Resin penetrates deep into tightly packed coil wire creating a strong bond that guards against end-turn vibration.



MOISTURE PROTECTION

Contaminants can’t penetrate carefully and tightly packed stator coils bonded by deep resin penetration into the slots.

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Oil Gas TECHNOLOGY
Coal Age
WATER ONLINE
Drives&Controls
HVAC*Informed*.com
Building Comfort With Responsibility
COMMERCIAL Construction Renovation
PUMPS& SYSTEMS
COMPRESSOR TECH
IMPELLER.NET
ACpro site.com
CABLING Installation & Maintenance
DESIGN ENGINEERING
HVAC INSIDER Online
PUMP INDUSTRY
Industrial Supply
AZO MINING
PLANT AUTOMATION Technology
MANUFACTURING TOMORROW
MPT Modern Pumping Today
WC&P INTERNATIONAL
NORTH AMERICAN MINING
ROCK PRODUCTS
PROCESS EQUIPMENT & CONTROL NEWS
E&MJ ENGINEERING AND MINING JOURNAL
DATA CENTRE & NETWORK NEWS
Official Publication of the American Supply Association
SUPPLYHOUSE TIMES
FLUIDPOWER JOURNAL
INFORMED INFRASTRUCTURE The magazine for civil & structural engineers
Water Technology
climate control

Our Technologies: The word is getting out!

Our product experts help generate stories that are attracting over 3 million impressions and views per year.

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EMR.3 EMR-Bulldozer Ferrite Assisted Synchronous Reluctance Motors
EMR.3 Standard Features
EMR.4 Standard End Shield Pricing
EMR.5 C-Face Pricing
EMR.6 Standard End Shield Dimensions
EMR.7 C-Face Dimensions



WOLONG

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Ultra-Efficient Air/Water Movers

EMR-Bulldozer Series Ferrite-Assisted Synchronous Reluctance Motors

Low Harmonic Distortion Fe-SynR Motor with Int. Drive
NEMA Frames 254T - 286T
20 - 50 HP
380 - 480 V
1200 / 1800 / 3600 RPM

Fe-SynR Motor with Integrated Drive
NEMA Frames 182T - 286T
3 - 50 HP
380 - 480 V
1200 / 1800 / 3600 RPM

Fe-SynR Motor
NEMA Frames 143T - 326T
1 - 125 HP
208-230/460 V
1200 / 1800 / 3600 RPM

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EMR-Bulldozer
(Electric Motor Reluctance) SynRM Drive System

Standard Features



NEMA Frame Size	184 - 286
Speed	1200, 1800, 3600
HP Range	3 - 50
Voltage	380 - 480
Input	2 analog inputs, 4 configurable digital inputs (analog or digital)
Output	1 relay ouput
Control	Direct Flux Control (DFC)
Interface	Serial Modbus J2 Interface
Shaft Extension	T
Agency Approvals	UL
Altitude	3300 ft
Ambient - Maximum	60°C
Bearing L10 Life	Direct coupled - 65,000 hrs
Bearing Caps	2Z-two-sided dust cover
Bearing Lubricant	Lithium soap grease
Bearing Type	Deep groove sealed ball bearings
Efficiency	IE5
Enclosure	TEFC, IP55
End Shield Material	Aluminum for T frame 184-256 and Cast Iron for frame 286 (Cast Iron for C-Face)
Fan	Fiber glass, non sparking
Fan Cover Material	Fiber glass
Field Modifiable to F2	Yes
Frame Material	Aluminum for frame 184-256 and Cast Iron for frame 286
Frequency	60 Hz
Insulation Class	Class F
Insulation System	Non-hygroscopic and anti-fungus
Lifting	FR 184 and 215 one lifting lug on each side; FR 256 and 286 two lifting lugs on each side
Mounting	Horizontal foot mounted
Name Plate	Stainless Steel
NEMA Design	B
Paint	Epoxy Ester
Service Factor	1.0
Shaft	1045 Carbon Steel
Warranty	12 months from date of installation or 18 months from date of delivery, whichever occurs first
Winding Temperature Rise	Class B @ 1.0SF

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EMR-Bulldozer

TEFC
Integrated Drive System
Standard End Shield Models



Volts: 380 - 480
HP: 3 - 50

Standard End Shield Models

HP	RPM	Volts	Frame	Cat. No.	Model No.	Product Line	Normally Stocked	Notes
3	1800	380-480	184T	**SR4001**	5SK184BWD201	IMC	Y	
3	1200	380-480	184T	**SR6001**	5SK184BWD301	IMC	N	
5	3600	380-480	184T	**SR2001**	5SK184BWD101	IMC	N	
5	1800	380-480	184T	**SR4002**	5SK184BWD202	IMC	Y	
5	1200	380-480	215T	**SR6002**	5SK215BWD301	IMC	N	
7.5	3600	380-480	215T	**SR2002**	5SK215BWD101	IMC	N	
7.5	1800	380-480	215T	**SR4003**	5SK215BWD201	IMC	Y	
7.5	1200	380-480	215T	**SR6003**	5SK215BWD302	IMC	N	
10	3600	380-480	215T	**SR2003**	5SK215BWD102	IMC	N	
10	1800	380-480	215T	**SR4004**	5SK215BWD202	IMC	Y	
10	1200	380-480	256T	**SR6004**	5SK256BWD301	IMC	N	
15	3600	380-480	256T	**SR2004**	5SK256BWD101	IMC	N	
15	1800	380-480	256T	**SR4005**	5SK256BWD201	IMC	Y	
15	1200	380-480	256T	**SR6005**	5SK256BWD302	IMC	N	
20	3600	380-480	256T	**SR2005**	5SK256BWD102	IMC	N	
20	1800	380-480	256T	**SR4006**	5SK256BWD202	IMC	Y	
20	1200	380-480	286T	**SR6006**	5SK286BWE301	IMC	N	
25	3600	380-480	256T	**SR2006**	5SK256BWD103	IMC	N	
25	1800	380-480	256T	**SR4007**	5SK256BWD203	IMC	Y	
25	1200	380-480	286T	**SR6007**	5SK286BWE302	IMC	N	
30	3600	380-480	286T	**SR2007**	5SK286BWE101	IMC	N	
30	1800	380-480	286T	**SR4008**	5SK286BWE201	IMC	Y	
30	1200	380-480	286T	**SR6008**	5SK286BWE303	IMC	N	
40	3600	380-480	286T	**SR2008**	5SK286BWE102	IMC	N	
40	1800	380-480	286T	**SR4009**	5SK286BWE202	IMC	Y	
40	1200	380-480	286T	**SR6009**	5SK286BWE304	IMC	N	
50	3600	380-480	286T	**SR2009**	5SK286BWE103	IMC	N	
50	1800	380-480	286T	**SR4010**	5SK286BWE203	IMC	Y	

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EMR-Bulldozer

TEFC
Integrated Drive System
C-Face Models



Volts: 380 - 480
HP: 3 - 50

C-Face Models

HP	RPM	Volts	Frame	Cat. No.	Model No.	Product Line	Normally Stocked	Notes
3	1800	380-480	184TC	**SR4011**	5SK184KWD201	IMC	N	
3	1200	380-480	184TC	**SR6011**	5SK184KWD301	IMC	N	
5	3600	380-480	184TC	**SR2011**	5SK184KWD101	IMC	N	
5	1800	380-480	184TC	**SR4012**	5SK184KWD202	IMC	N	
5	1200	380-480	215TC	**SR6012**	5SK215KWD301	IMC	N	
7.5	3600	380-480	215TC	**SR2012**	5SK215KWD101	IMC	N	
7.5	1800	380-480	215TC	**SR4013**	5SK215KWD201	IMC	N	
7.5	1200	380-480	215TC	**SR6013**	5SK215KWD302	IMC	N	
10	3600	380-480	215TC	**SR2013**	5SK215KWD102	IMC	N	
10	1800	380-480	215TC	**SR4014**	5SK215KWD202	IMC	N	
10	1200	380-480	256TC	**SR6014**	5SK256KWD301	IMC	N	
15	3600	380-480	256TC	**SR2014**	5SK256KWD101	IMC	N	
15	1800	380-480	256TC	**SR4015**	5SK256KWD201	IMC	N	
15	1200	380-480	256TC	**SR6015**	5SK256KWD302	IMC	N	
20	3600	380-480	256TC	**SR2015**	5SK256KWD102	IMC	N	
20	1800	380-480	256TC	**SR4016**	5SK256KWD202	IMC	N	
20	1200	380-480	286TC	**SR6016**	5SK286KWE301	IMC	N	
25	3600	380-480	256TC	**SR2016**	5SK256KWD103	IMC	N	
25	1800	380-480	256TC	**SR4017**	5SK256KWD203	IMC	N	
25	1200	380-480	286TC	**SR6017**	5SK286KWE302	IMC	N	
30	3600	380-480	286TC	**SR2017**	5SK286KWE101	IMC	N	
30	1800	380-480	286TC	**SR4018**	5SK286KWE201	IMC	N	
30	1200	380-480	286TC	**SR6018**	5SK286KWE303	IMC	N	
40	3600	380-480	286TC	**SR2018**	5SK286KWE102	IMC	N	
40	1800	380-480	286TC	**SR4019**	5SK286KWE202	IMC	N	
40	1200	380-480	286TC	**SR6019**	5SK286KWE304	IMC	N	
50	3600	380-480	286TC	**SR2019**	5SK286KWE103	IMC	N	
50	1800	380-480	286TC	**SR4020**	5SK286KWE203	IMC	N	

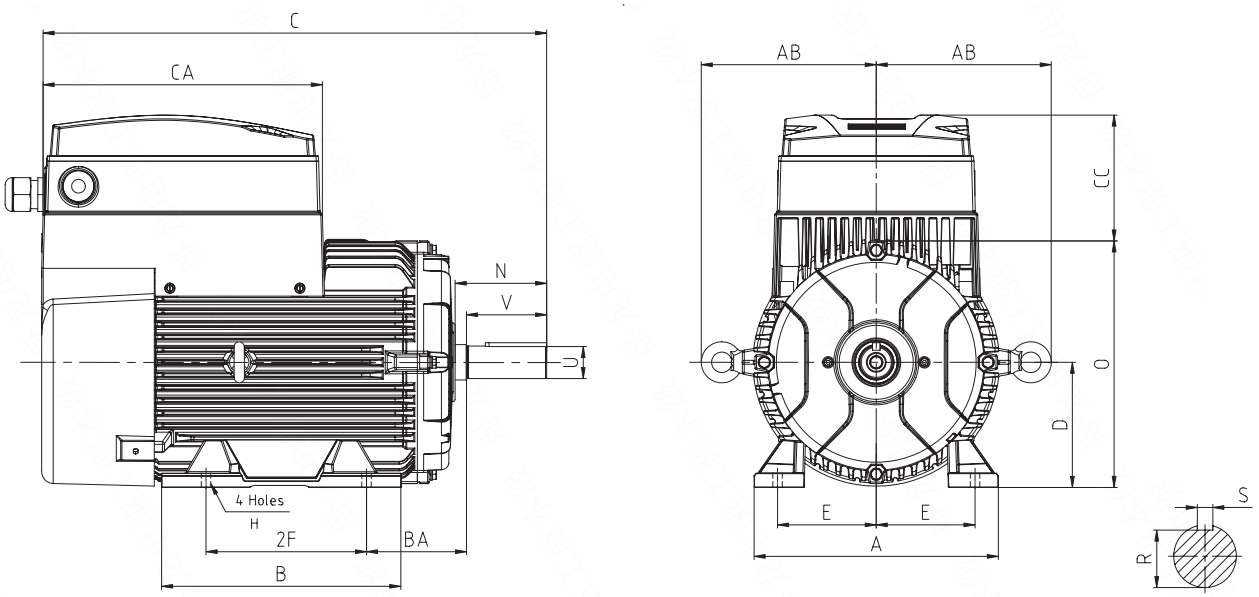
WOLONG
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EMR-Bulldozer

TEFC
Integrated Drive System
Standard End Shield Models

Dimensions





Foot Mount

NEMA Frame	Dimensions in Inches														
	A	D	E	2F	B	BA	H	V	R	S	O	AB	CA	C	CC
184T	9.08	4.50	3.75	5.50	7.80	2.75	0.41	2.75	0.99	0.25	8.54	5.73	11.46	17.91	3.87
215T	10.31	5.25	4.25	7.00	9.84	3.50	0.41	3.38	1.20	0.31	10.13	6.93	13.78	19.88	6.31
256T	12.21	6.25	5.00	10.10	11.98	5.42	0.53	4.00	1.42	0.38	12.32	8.75	17.71	25.26	10.01
286T	13.74	7.00	5.50	11.00	13.45	4.75	0.53	4.62	1.59	0.50	14.00	10.20	17.71	30.51	10.25

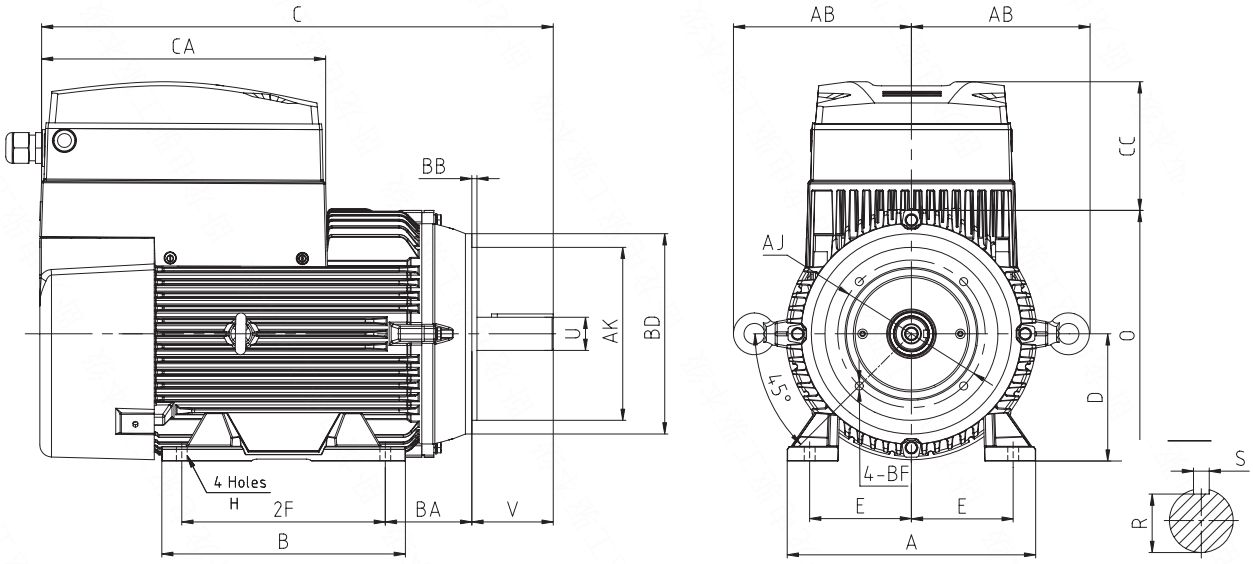
WOLONG
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EMR-Bulldozer

TEFC
Integrated Drive System
C-Face Models

Dimensions





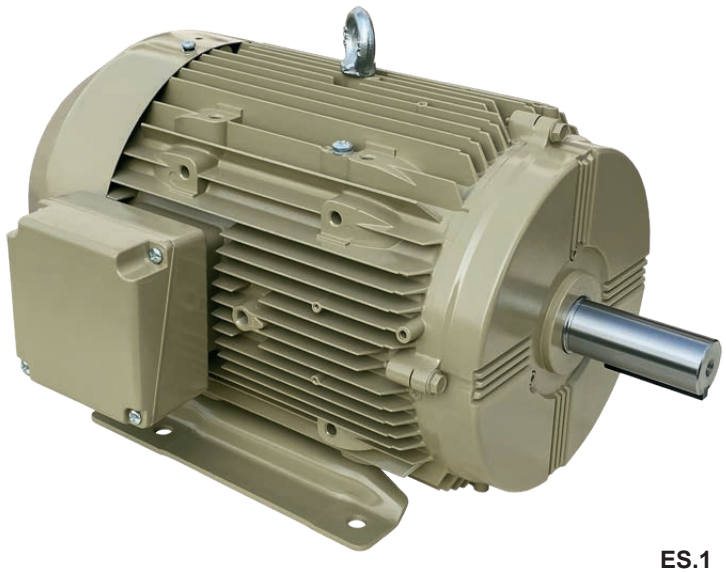
C-Face

NEMA Frame	Dimensions in Inches										
	A	D	E	2F	B	BA	H	U	V	R	S
184T	9.08	4.50	3.75	5.50	7.80	2.75	0.41	1.13	2.75	0.99	0.25
215T	10.31	5.25	4.25	7.00	9.84	3.50	0.41	1.38	3.38	1.20	0.31
256T	12.21	6.25	5.00	10.10	11.98	5.42	0.53	1.63	4.00	1.42	0.38
286T	13.74	7.00	5.50	11.00	13.45	4.75	0.53	1.88	4.62	1.59	0.50

NEMA Frame	Dimensions in Inches									
	O	AB	CA	C	CC	BB	BD	AJ	AK	BF
184T	8.54	5.73	10.32	17.91	4.62	0.25	9.00	7.25	8.50	0.50
215T	10.13	6.93	10.72	19.88	4.51	0.25	9.00	7.25	8.50	0.50
256T	12.32	8.75	14.03	25.26	6.30	0.25	10.00	7.25	8.50	0.50
286T	14.00	10.20	17.72	30.51	9.48	0.25	11.25	9.00	10.50	0.50

Notes

ES.3 **TEFC Severe Duty**
ES.3 Standard Features
ES.4 IP55 Cast Iron and Aluminum Frame Pricing
ES.9 C-Face Pricing
ES.13 C-Face Close Coupled Pump Pricing
ES.15 Dimensions
ES.24 C-Face Kits



WOLONG

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Energy Saver SD Motors

NEMA B premium efficient, rugged and reliable designs ideal for severe duty applications.

Cast Iron Frames

These motors are used in a wide range of applications in extreme industrial environments such as petroleum, chemical, pulp and paper, water and wastewater, mining and mineral processing , among others.

Aluminum Frames

These motors are widely used in a diverse range of applications from food and beverage to water and wastewater, HVAC, and refrigeration among others. Benefits of aluminum over cast iron include, high resistance to most kinds of environmental corrosion, cooler running, and lighter weight.

www.emporiumve.com

Energy Saver

TEFC Severe Duty (IP55)

Standard Features

These features apply to only models with the model number form letters of BWV or BWC.

HP Range	1 - 250
Poles	2, 4
Voltage	208-230/460, 460, 575
Efficiency	Per USA and Canada Legislation
Frequency	60 and 50 at same horsepower
NEMA Frame Size	143-449
NEMA Design	B
Shaft Extension	T except 284-447 2-pole are TS
Agency Approvals	CSA
Altitude	3300 ft
Ambient - Maximum	40°C
Conduit Box Cover Gasket	Nitrile-butadiene rubber
Conduit Box Hole Thread	NPT
Conduit Box Rotation	90 degree
Div 2 Temp Codes	Division 2 Class I Groups A, B, C and D T3 temp code
Enclosure	TEFC
Fan	Non-sparking
Fan Cover Material	Stamped Steel
Field Modifiable to F2	Removable feet for F1/F2/F3 and round
Frame/Conduit Box Gasket	Nitrile-butadiene rubber
Insulation Class	Class F
Insulation System	Non-hygroscopic, anti-fungus, polyester resin
Inverter Capabilities	5:1 Constant Torque @ 100% TN, 15:1 Constant Torque @ 66.7% TN, 10:1 Variable Torque
Paint Color	Buff
Service Factor	1.25 @ 60Hz, 1.0 @ 50Hz
Sound Power	NEMA MG 1 Part 9
Warranty	36 months
Winding Temperature Rise	80ºC @ 1.0SF

Energy Saver

TEFC Severe Duty (IP55)
GE Branded Cast Iron and Aluminum Frame Motors

GEGARD INSULATION INVERTER DUTY EXCEEDS NEMA MG1-31

NEMA Premium



Volts: 208-230/460, 230/460, 460, 575
HP: 1 - 250

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
1	3600	208-230/460	143T	**WV659**	5KS143BWC120	Y	8BK0130003000	190
1	3600	208-230/460	143T	**WV577**	5KS143BWV120	Y	8BK0130003000	191
1	3600	230/460	143T	**M1462**	5KS143BAA121	N		198
1	3600	575	143T	**WV786**	5KS143BWC121	N	8BK0130003000	190
1	1800	208-230/460	143T	**WV660**	5KS143BWC205	Y	8BK0130003000	190
1	1800	208-230/460	143T	**WV000**	5KS143BWV205	Y	8BK0130003000	191
1	1800	230/460	143T	**M1482**	5KS143BAA205	N		198
1	1800	575	143T	**WV787**	5KS143BWC204	N	8BK0130003000	190
1	1200	230/460	145T	**WV664**	5KS145BWC305	Y	8BK0130003000	190
1.5	3600	208-230/460	143T	**WV658**	5KS143BWC105	Y	8BK0130003000	190
1.5	3600	208-230/460	143T	**WV001**	5KS143BWV105	Y	8BK0130003000	191
1.5	3600	230/460	143T	**M1486**	5KS143BAA105	N		198
1.5	3600	575	143T	**WV788**	5KS143BWC104	N	8BK0130003000	190
1.5	1800	208-230/460	145T	**WV662**	5KS145BWC205	Y	8BK0130003000	190
1.5	1800	208-230/460	145T	**WV002**	5KS145BWV201	Y	8BK0130003000	191
1.5	1800	230/460	145T	**M1492**	5KS145BAA221	N		198
1.5	1800	575	145T	**WV789**	5KS145BWC204	N	8BK0130003000	190
1.5	1200	230/460	182T	**M1702**	5KS182BAA305	N		198
1.5	1200	230/460	182T	**WV667**	5KS182BWC305	Y	8BK0130009200	190
2	3600	208-230/460	145T	**WV661**	5KS145BWC105	Y	8BK0130003000	190
2	3600	208-230/460	145T	**WV003**	5KS145BWV105	Y	8BK0130003000	191
2	3600	230/460	145T	**M1490**	5KS145BAA105	N		198
2	3600	575	145T	**WV790**	5KS145BWC104	N	8BK0130003000	190
2	1800	208-230/460	145T	**WV663**	5KS145BWC220	Y	8BK0130003000	190
2	1800	208-230/460	145T	**WV004**	5KS145BWV205	Y	8BK0130003000	191
2	1800	575	145T	**WV791**	5KS145BWC221	N	8BK0130003000	190
2	1200	230/460	184T	**WV675**	5KS184BWC305	Y	8BK0130009200	190
3	3600	208-230/460	182T	**WV665**	5KS182BWC105	Y	8BK0130009200	190
3	3600	208-230/460	182T	**WV005**	5KS182BWV105	Y	8BK0130009200	191
3	3600	230/460	182T	**M1713**	5KS182BAA105	N		198
3	3600	575	182T	**WV792**	5KS182BWC104	N	8BK0130009200	190
3	1800	208-230/460	182T	**WV666**	5KS182BWC205	Y	8BK0130009200	190
3	1800	208-230/460	182T	**WV006**	5KS182BWV205	Y	8BK0130009200	191
3	1800	230/460	182T	**M1241**	5KS182BAA205	N		198
3	1800	575	182T	**WV793**	5KS182BWC204	N	8BK0130009200	190
3	1200	230/460	213T	**M1142**	5KS213BAA305	N		198
3	1200	230/460	213T	**WV679**	5KS213BWC305	Y	801030093801	190

Notes:
190 Cast Iron Model - refer to dimension pages ES.20-ES.23
191 Aluminum Model - refer to dimension pages ES.18-ES.19
198 GEIM Model - use dimensions on pages ES.15-ES.17

Energy Saver

TEFC Severe Duty (IP55)
GE Branded Cast Iron and Aluminum Frame Motors



Volts: 208-230/460, 230/460, 460, 575
HP: 1 - 250

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
5	3600	208-230/460	184T	**WV669**	5KS184BWC105	Y	8BK0130009200	190
5	3600	208-230/460	184T	**WV007**	5KS184BWV105	Y	8BK0130009200	191
5	3600	230/460	184T	**M1240**	5KS184BAA105	N		198
5	3600	575	184T	**WV794**	5KS184BWC104	N	8BK0130009200	190
5	1800	208-230/460	184T	**WV672**	5KS184BWC205	Y	8BK0130009200	190
5	1800	208-230/460	184T	**WV008**	5KS184BWV205	Y	8BK0130009200	191
5	1800	575	184T	**WV795**	5KS184BWC204	N	8BK0130009200	190
5	1200	230/460	215T	**M1143**	5KS215BAA305	N		198
5	1200	230/460	215T	**WV683**	5KS215BWC305	Y	801030093801	190
7.5	3600	208-230/460	213T	**WV677**	5KS213BWC105	Y	801030093801	190
7.5	3600	208-230/460	213T	**WV009**	5KS213BWV105	Y	801030093801	191
7.5	3600	230/460	213T	**M1144**	5KS213BAA105	N		198
7.5	3600	575	213T	**WV796**	5KS213BWC104	N	801030093801	190
7.5	1800	208-230/460	213T	**WV678**	5KS213BWC205	Y	801030093801	190
7.5	1800	208-230/460	213T	**WV010**	5KS213BWV205	Y	801030093801	191
7.5	1800	230/460	213T	**M1145**	5KS213BAA205	N		198
7.5	1800	575	213T	**WV797**	5KS213BWC204	N	801030093801	190
7.5	1200	230/460	254T	**M1146**	5KS254BAA305	N		198
7.5	1200	230/460	254T	**WV689**	5KS254BWC305	Y	8BK0130003200	190
10	3600	208-230/460	215T	**WV681**	5KS215BWC105	Y	801030093801	190
10	3600	208-230/460	215T	**WV011**	5KS215BWV105	Y	801030093801	191
10	3600	230/460	215T	**M1147**	5KS215BAA105	N		198
10	3600	575	215T	**WV798**	5KS215BWC104	N	801030093801	190
10	1800	208-230/460	215T	**WV682**	5KS215BWC205	Y	801030093801	190
10	1800	208-230/460	215T	**WV012**	5KS215BWV205	Y	801030093801	191
10	1800	230/460	215T	**M1148**	5KS215BAA205	N		198
10	1800	575	215T	**WV799**	5KS215BWC204	N	801030093801	190
10	1200	230/460	256T	**M1149**	5KS256BAA305	N		198
10	1200	230/460	256T	**WV695**	5KS256BWC305	Y	8BK0130003200	190
15	3600	208-230/460	254T	**WV687**	5KS254BWC105	Y	8BK0130003200	190
15	3600	208-230/460	254T	**WV013**	5KS254BWV105	Y	8BK0130003200	191
15	3600	230/460	254T	**M1150**	5KS254BAA105	N		198
15	3600	575	254T	**WV800**	5KS254BWC104	N	8BK0130003200	190
15	1800	208-230/460	254T	**WV688**	5KS254BWC205	Y	8BK0130003200	190
15	1800	208-230/460	254T	**WV014**	5KS254BWV205	Y	8BK0130003200	191
15	1800	230/460	254T	**M1151**	5KS254BAA205	N		198
15	1800	575	254T	**WV801**	5KS254BWC204	N	8BK0130003200	190

Notes:
190 Cast Iron Model - refer to dimension pages ES.20-ES.23
191 Aluminum Model - refer to dimension pages ES.18-ES.19
198 GEIM Model - use dimensions on pages ES.15-ES.17

Energy Saver

TEFC Severe Duty (IP55)
GE Branded Cast Iron and Aluminum Frame Motors



Volts: 208-230/460, 230/460, 460, 575
HP: 1 - 250

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
15	1200	230/460	284T	**M1152**	5KS284BAA305	N		198
15	1200	230/460	284T	**WV699**	5KS284BWC305	Y	8BK0130009900	190
20	3600	208-230/460	256T	**WV693**	5KS256BWC105	Y	8BK0130003200	190
20	3600	208-230/460	256T	**WV015**	5KS256BWV105	Y	8BK0130003200	191
20	3600	230/460	256T	**M1153**	5KS256BAA105	N		198
20	3600	575	256T	**WV802**	5KS256BWC104	N	8BK0130003200	190
20	1800	208-230/460	256T	**WV694**	5KS256BWC205	Y	8BK0130003200	190
20	1800	208-230/460	256T	**WV016**	5KS256BWV205	Y	8BK0130003200	191
20	1800	230/460	256T	**M1154**	5KS256BAA205	N		198
20	1800	575	256T	**WV803**	5KS256BWC204	N	8BK0130003200	190
20	1200	230/460	286T	**M1155**	5KS286BAA305	N		198
20	1200	230/460	286T	**WV703**	5KS286BWC305	Y	8BK0130009900	190
25	3600	208-230/460	284TS	**WV697**	5KS284BWC115	Y	8BK0130009900	190
25	3600	208-230/460	284TS	**WV017**	5KS284BWV115	Y	8BK0130009900	191
25	3600	230/460	284TS	**M1156**	5KS284BAA115	N		198
25	3600	575	284TS	**WV804**	5KS284BWC114	N	8BK0130009900	190
25	1800	208-230/460	284T	**WV698**	5KS284BWC205	Y	8BK0130009900	190
25	1800	208-230/460	284T	**WV018**	5KS284BWV205	Y	8BK0130009900	191
25	1800	230/460	284T	**M1157**	5KS284BAA205	N		198
25	1800	575	284T	**WV805**	5KS284BWC204	N	8BK0130009900	190
25	1200	230/460	324T	**M1158**	5KS324BAA305	N		198
30	3600	208-230/460	286TS	**WV701**	5KS286BWC115	Y	8BK0130009900	190
30	3600	208-230/460	286TS	**WV019**	5KS286BWV115	Y	8BK0130009900	191
30	3600	230/460	286TS	**M1159**	5KS286BAA115	N		198
30	3600	575	286TS	**WV806**	5KS286BWC114	N	8BK0130009900	190
30	1800	208-230/460	286T	**WV702**	5KS286BWC205	Y	8BK0130009900	190
30	1800	208-230/460	286T	**WV020**	5KS286BWV205	Y	8BK0130009900	191
30	1800	230/460	286T	**M1160**	5KS286BAA205	N		198
30	1800	575	286T	**WV807**	5KS286BWC204	N	8BK0130009900	190
30	1200	230/460	326T	**M1161**	5KS326BAA305	N		198
40	3600	208-230/460	324TS	**WV705**	5KS324BWC115	Y		190
40	3600	230/460	324TS	**M1162**	5KS324BAA115	N		198
40	3600	575	324TS	**WV808**	5KS324BWC114	N		190
40	1800	208-230/460	324T	**WV706**	5KS324BWC205	Y		190
40	1800	230/460	324T	**M1163**	5KS324BAA205	N		198
40	1800	575	324T	**WV809**	5KS324BWC204	N		190
40	1200	230/460	364T	**M1184**	5KS364BAA305	N		198

Notes:
190 Cast Iron Model - refer to dimension pages ES.20-ES.23
191 Aluminum Model - refer to dimension pages ES.18-ES.19
198 GEIM Model - use dimensions on pages ES.15-ES.17

Energy Saver

TEFC Severe Duty (IP55)
GE Branded Cast Iron and Aluminum Frame Motors



Volts: 208-230/460, 230/460, 460, 575
HP: 1 - 250

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
50	3600	208-230/460	326TS	**WV709**	5KS326BWC115	Y		190
50	3600	230/460	326TS	**M1164**	5KS326BAA115	N		198
50	3600	575	326TS	**WV810**	5KS326BWC114	N		190
50	1800	208-230/460	326T	**WV710**	5KS326BWC205	Y		190
50	1800	230/460	326T	**M1165**	5KS326BAA205	N		198
50	1800	575	326T	**WV811**	5KS326BWC204	N		190
50	1200	230/460	365T	**M1188**	5KS365BAA305	N		198
60	3600	208-230/460	364TS	**WV713**	5KS364BWC115	Y		190
60	3600	230/460	364TS	**M1190**	5KS364BAA115	Y		198
60	3600	575	364TS	**WV812**	5KS364BWC114	N		190
60	1800	208-230/460	364T	**WV714**	5KS364BWC205	Y		190
60	1800	230/460	364T	**M1191**	5KS364BAA205	Y		198
60	1800	575	364T	**WV813**	5KS364BWC204	N		190
60	1200	230/460	404T	**M1192**	5KS404BAA305	N		198
75	3600	208-230/460	365TS	**WV717**	5KS365BWC115	Y		190
75	3600	230/460	365TS	**M1194**	5KS365BAA115	Y		198
75	3600	575	365TS	**M1802**	5KS365BAA114	N		198
75	1800	230/460	365T	**M1195**	5KS365BAA205	Y		198
75	1800	575	365T	**M1803**	5KS365BAA204	N		198
75	1200	230/460	405T	**M1196**	5KS405BAA305	N		198
100	3600	230/460	405TS	**M1004**	5KS405BAA115	Y		198
100	3600	230/460	405TS	**WV723**	5KS405BWC115	Y		190
100	3600	575	405TS	**M1804**	5KS405BAA114	N		198
100	1800	230/460	405T	**M1924**	5KS405BAA205	Y		198
100	1800	230/460	405T	**WV724**	5KS405BWC205	Y		190
100	1800	575	405T	**M1805**	5KS405BAA204	N		198
100	1200	460	444T	**M1131**	5KS444BAA308	N		198
125	3600	460	444TS	**M1511**	5KS444BAA118	Y		198
125	3600	460	444TS	**WV727**	5KS444BWC118	Y		190
125	3600	575	444TS	**M1806**	5KS444BAA114	N		198
125	1800	460	444T	**M1926**	5KS444BAA208	Y		198
125	1800	460	444T	**WV728**	5KS444BWC208	Y		190
125	1800	575	444T	**M1807**	5KS444BAA204	N		198
125	1200	460	445T	**M1135**	5KS445BAA308	N		198

Notes:
190 Cast Iron Model - refer to dimension pages ES.20-ES.23
191 Aluminum Model - refer to dimension pages ES.18-ES.19
198 GEIM Model - use dimensions on pages ES.15-ES.17

Energy Saver

TEFC Severe Duty (IP55)
GE Branded Cast Iron and Aluminum Frame Motors



Volts: 208-230/460, 230/460, 460, 575
HP: 1 - 250

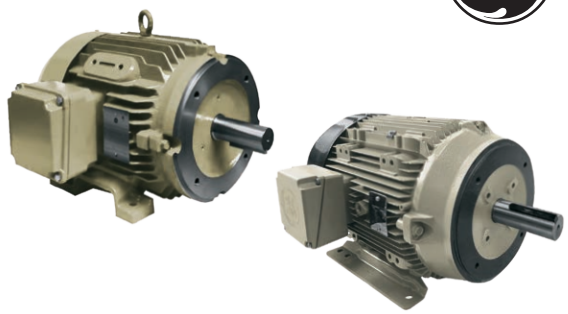
HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
150	3600	460	445TS	**M1512**	5KS445BAA118	Y		198
150	3600	575	445TS	**M1808**	5KS445BAA114	N		198
150	1800	460	445T	**M1928**	5KS445BAA208	Y		198
150	1800	460	445T	**WV734**	5KS445BWC208	Y		190
150	1800	575	445T	**M1809**	5KS445BAA204	N		198
150	1200	460	447T	**M1137**	5KS447BAA308	N		198
200	3600	460	447TS	**M1008**	5KS447BAA101	Y		62, 198
200	3600	460	447TS	**M1961**	5KS447BAA118	Y		66, 198
200	3600	460	447TS	**WV739**	5KS447BWC118	Y		190
200	3600	575	447TS	**M1810**	5KS447BAA102	N		62, 198
200	3600	575	447TS	**M1811**	5KS447BAA114	N		66, 198
200	1800	460	447T	**M1958**	5KS447BAA208	Y		198
200	1800	460	447T	**WV740**	5KS447BWC208	Y		190
200	1800	575	447T	**M1812**	5KS447BAA204	N		198
200	1200	460	449T	**M1139**	5KS449BAA308	N		198
250	3600	460	449TS	**M1996**	5KS449BAA101	Y		62, 198
250	3600	460	449TS	**M1514**	5KS449BAA118	Y		66, 198
250	3600	575	449TS	**M1813**	5KS449BAA102	N		62, 198
250	3600	575	449TS	**M1814**	5KS449BAA114	N		66, 198
250	1800	460	449T	**M1933**	5KS449BAA208	Y		198

Notes:

62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
190 Cast Iron Model - refer to dimension pages ES.20-ES.23
191 Aluminum Model - refer to dimension pages ES.18-ES.19
198 GEIM Model - use dimensions on pages ES.15-ES.17

Energy Saver

TEFC Severe Duty
C-Face



Volts: 208-230/460, 230/460, 460, 575
HP: 1 - 250

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
1	3600	208-230/460	143TC	**WV578**	5KS143KWV101	N	191
1	3600	230/460	143TC	**M1048**	5KS143BAA100	N	198
1	1800	208-230/460	143TC	**WV580**	5KS143KWC205	N	190
1	1800	208-230/460	143TC	**WV100**	5KS143KWV205	Y	191
1	1800	575	143TC	**WV814**	5KS143KWC204	N	190
1	1200	230/460	145TC	**M1050**	5KS145BAA300	N	198
1.5	3600	208-230/460	143TC	**WV579**	5KS143KWC105	N	190
1.5	3600	208-230/460	143TC	**WV101**	5KS143KWV105	N	191
1.5	3600	230/460	143TC	**M1051**	5KS143BAA102	N	198
1.5	3600	575	143TC	**WV815**	5KS143KWC104	N	190
1.5	1800	208-230/460	145TC	**WV582**	5KS145KWC205	N	190
1.5	1800	208-230/460	145TC	**WV102**	5KS145KWV201	Y	191
1.5	1800	230/460	145TC	**M1052**	5KS145BAA202	Y	198
1.5	1800	575	145TC	**WV816**	5KS145KWC204	N	190
2	3600	208-230/460	145TC	**WV581**	5KS145KWC105	N	190
2	3600	208-230/460	145TC	**WV103**	5KS145KWV105	N	191
2	3600	230/460	145TC	**M1054**	5KS145BAA100	N	198
2	3600	575	145TC	**WV817**	5KS145KWC104	N	190
2	1800	208-230/460	145TC	**WV104**	5KS145KWV205	Y	191
2	1200	230/460	184TC	**M1056**	5KS184BAA300	N	198
3	3600	208-230/460	182TC	**WV584**	5KS182KWC105	N	190
3	3600	208-230/460	182TC	**WV105**	5KS182KWV105	N	191
3	3600	575	182TC	**WV818**	5KS182KWC104	N	190
3	1800	208-230/460	182TC	**WV585**	5KS182KWC205	Y	190
3	1800	208-230/460	182TC	**WV106**	5KS182KWV205	Y	191
3	1800	575	182TC	**WV819**	5KS182KWC204	N	190
3	1200	230/460	213TC	**M1059**	5KS213BAA300	N	198
5	3600	208-230/460	184TC	**WV588**	5KS184KWC105	N	190
5	3600	208-230/460	184TC	**WV107**	5KS184KWV105	N	191
5	3600	575	184TC	**WV820**	5KS184KWC104	N	190
5	1800	208-230/460	184TC	**WV589**	5KS184KWC205	Y	190
5	1800	208-230/460	184TC	**WV108**	5KS184KWV205	Y	191
5	1800	575	184TC	**WV821**	5KS184KWC204	N	190
5	1200	230/460	215TC	**M1062**	5KS215BAA300	N	198
7.5	3600	208-230/460	213TC	**WV592**	5KS213KWC105	N	190
7.5	3600	208-230/460	213TC	**WV109**	5KS213KWV105	N	191
7.5	3600	230/460	213TC	**M1063**	5KS213BAA100	N	198
7.5	3600	575	213TC	**WV822**	5KS213KWC104	N	190

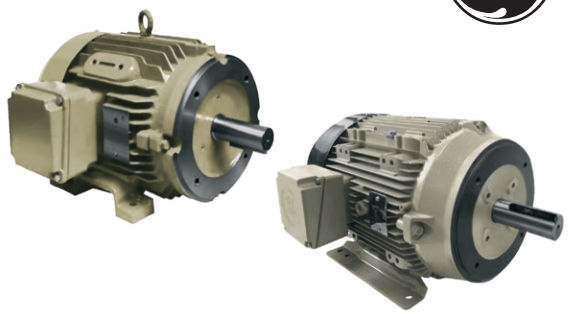
Notes:
190 Cast Iron Model - refer to dimension pages ES.20-ES.23
191 Aluminum Model - refer to dimension pages ES.18-ES.19
198 GEIM Model - use dimensions on pages ES.15-ES.17

Energy Saver

TEFC Severe Duty
C-Face

GEGARD INSULATION INVERTER DUTY EXCEEDS NEMA MG1-31

NEMA Premium



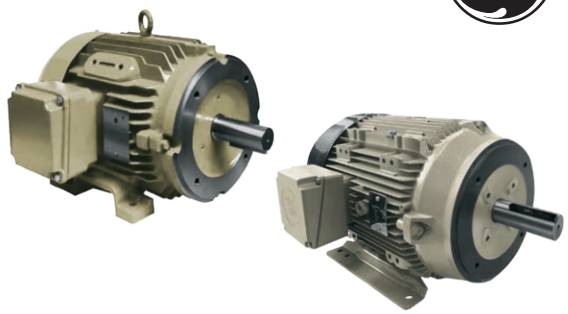
Volts: 208-230/460, 230/460, 460, 575
HP: 1 - 250

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
7.5	1800	208-230/460	213TC	**WV593**	5KS213KWC205	Y	190
7.5	1800	208-230/460	213TC	**WV110**	5KS213KWV205	Y	191
7.5	1800	230/460	213TC	**M1064**	5KS213BAA200	Y	198
7.5	1800	575	213TC	**WV823**	5KS213KWC204	N	190
7.5	1200	230/460	254TC	**M1065**	5KS254BAA300	N	198
10	3600	208-230/460	215TC	**WV596**	5KS215KWC105	N	190
10	3600	208-230/460	215TC	**WV111**	5KS215KWV105	N	191
10	3600	230/460	215TC	**M1066**	5KS215BAA100	N	198
10	3600	575	215TC	**WV824**	5KS215KWC104	N	190
10	1800	208-230/460	215TC	**WV597**	5KS215KWC205	Y	190
10	1800	208-230/460	215TC	**WV112**	5KS215KWV205	Y	191
10	1800	230/460	215TC	**M1067**	5KS215BAA200	N	198
10	1800	575	215TC	**WV825**	5KS215KWC204	N	190
10	1200	230/460	256TC	**M1068**	5KS256BAA300	N	198
15	3600	208-230/460	254TC	**WV600**	5KS254KWC105	N	190
15	3600	208-230/460	254TC	**WV113**	5KS254KWV105	N	191
15	3600	230/460	254TC	**M1069**	5KS254BAA100	N	198
15	3600	575	254TC	**WV826**	5KS254KWC104	N	190
15	1800	208-230/460	254TC	**WV601**	5KS254KWC205	Y	190
15	1800	208-230/460	254TC	**WV114**	5KS254KWV205	Y	191
15	1800	230/460	254TC	**M1070**	5KS254BAA200	N	198
15	1800	575	254TC	**WV827**	5KS254KWC204	N	190
15	1200	230/460	284TC	**M1071**	5KS284BAA300	N	198
20	3600	208-230/460	256TC	**WV604**	5KS256KWC105	N	190
20	3600	208-230/460	256TC	**WV115**	5KS256KWV105	N	191
20	3600	230/460	256TC	**M1072**	5KS256BAA100	N	198
20	3600	575	256TC	**WV828**	5KS256KWC104	N	190
20	1800	208-230/460	256TC	**WV605**	5KS256KWC205	Y	190
20	1800	208-230/460	256TC	**WV116**	5KS256KWV205	Y	191
20	1800	230/460	256TC	**M1073**	5KS256BAA200	N	198
20	1800	575	256TC	**WV829**	5KS256KWC204	N	190
20	1200	230/460	286TC	**M1074**	5KS286BAA300	N	198
25	3600	208-230/460	284TSC	**WV608**	5KS284KWC115	N	190
25	3600	208-230/460	284TSC	**WV117**	5KS284KWV115	N	191
25	3600	230/460	284TSC	**M1075**	5KS284BAA100	N	198
25	3600	575	284TSC	**WV830**	5KS284KWC114	N	190

Notes:
190 Cast Iron Model - refer to dimension pages ES.20-ES.23
191 Aluminum Model - refer to dimension pages ES.18-ES.19
198 GEIM Model - use dimensions on pages ES.15-ES.17

Energy Saver

TEFC Severe Duty
C-Face



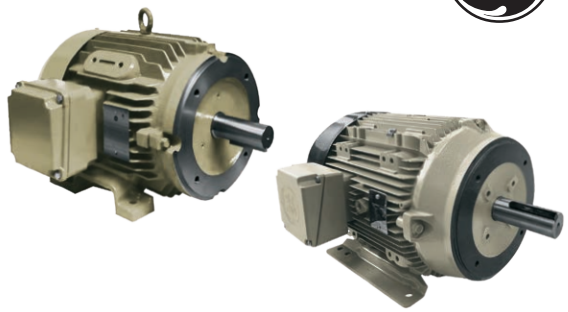
Volts: 208-230/460, 230/460, 460, 575
HP: 1 - 250

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
25	1800	208-230/460	284TC	**WV609**	5KS284KWC205	Y	190
25	1800	208-230/460	284TC	**WV118**	5KS284KWV205	Y	191
25	1800	230/460	284TC	**M1076**	5KS284BAA200	N	198
25	1800	575	284TC	**WV831**	5KS284KWC204	N	190
30	3600	208-230/460	286TSC	**WV612**	5KS286KWC115	N	190
30	3600	208-230/460	286TSC	**WV119**	5KS286KWV115	N	191
30	3600	230/460	286TSC	**M1077**	5KS286BAA100	N	198
30	3600	575	286TSC	**WV832**	5KS286KWC114	N	190
30	1800	208-230/460	286TC	**WV613**	5KS286KWC205	Y	190
30	1800	208-230/460	286TC	**WV120**	5KS286KWV205	Y	191
30	1800	230/460	286TC	**M1078**	5KS286BAA200	N	198
30	1800	575	286TC	**WV833**	5KS286KWC204	N	190
40	3600	208-230/460	324TSC	**WV616**	5KS324KWC115	N	190
40	3600	575	324TSC	**WV834**	5KS324KWC114	N	190
40	1800	208-230/460	324TC	**WV617**	5KS324KWC205	Y	190
40	1800	230/460	324TC	**M1000**	5KS324BAA201	Y	198
40	1800	575	324TC	**WV835**	5KS324KWC204	N	190
50	3600	208-230/460	326TSC	**WV620**	5KS326KWC115	N	190
50	3600	575	326TSC	**WV836**	5KS326KWC114	N	190
50	1800	208-230/460	326TC	**WV621**	5KS326KWC205	Y	190
50	1800	230/460	326TC	**M1001**	5KS326BAA201	Y	198
50	1800	575	326TC	**WV837**	5KS326KWC204	N	190
60	3600	208-230/460	364TSC	**WV624**	5KS364KWC115	N	190
60	3600	575	364TSC	**WV838**	5KS364KWC114	N	190
60	1800	208-230/460	364TC	**WV625**	5KS364KWC205	Y	190
60	1800	230/460	364TC	**M1002**	5KS364BAA201	Y	198
60	1800	575	364TC	**WV839**	5KS364KWC204	N	190
75	1800	230/460	365TC	**WV629**	5KS365KWC205	N	190
75	1800	230/460	365TC	**M1003**	5KS365BAA201	Y	198
75	1800	575	365TC	**M1815**	5KS365BAA202	N	198
100	1800	230/460	405TC	**WV635**	5KS405KWC205	N	190
100	1800	230/460	405TC	**M1005**	5KS405BAA201	Y	198
100	1800	575	405TC	**M1816**	5KS405BAA202	N	198
125	3600	460	444TSC	**M1997**	5KS444BAA100	N	198
125	1800	460	444TC	**WV639**	5KS444KWC208	N	190
125	1800	460	444TC	**M1006**	5KS444BAA201	Y	198
125	1800	575	444TC	**M1817**	5KS444BAA202	N	198

Notes:
190 Cast Iron Model - refer to dimension pages ES.20-ES.23
191 Aluminum Model - refer to dimension pages ES.18-ES.19
198 GEIM Model - use dimensions on pages ES.15-ES.17

Energy Saver

TEFC Severe Duty
C-Face



Volts: 208-230/460, 230/460, 460, 575
HP: 1 - 250

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
150	1800	460	445TC	**WV643**	5KS445KWC208	N	190
150	1800	460	445TC	**M1007**	5KS445BAA201	Y	198
150	1800	575	445TC	**M1818**	5KS445BAA202	N	198
200	1800	460	447TC	**WV647**	5KS447KWC208	N	190
200	1800	460	447TC	**M1009**	5KS447BAA201	Y	198
200	1800	575	447TC	**M1819**	5KS447BAA202	N	198
250	1800	460	449TC	**M1010**	5KS449BAA201	Y	198

Notes:
190 Cast Iron Model - refer to dimension pages ES.20-ES.23
191 Aluminum Model - refer to dimension pages ES.18-ES.19
198 GEIM Model - use dimensions on pages ES.15-ES.17

Energy Saver

TEFC Severe Duty
C-Face
Close Coupled Pump



Volts: 208-230/460
HP: 1 - 75

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
1	3600	208-230/460	143JM	**WV229**	5KS143KWV110	N	191
1	3600	208-230/460	143JP	**WV329**	5KS143KWV111	Y	191
1	1800	208-230/460	143JM	**WV200**	5KS143KWV203	Y	191
1	1800	208-230/460	143JP	**WV300**	5KS143KWV209	Y	191
1.5	3600	208-230/460	143JM	**WV201**	5KS143KWV103	Y	191
1.5	3600	208-230/460	143JP	**WV301**	5KS143KWV109	Y	191
1.5	1800	208-230/460	145JM	**WV202**	5KS145KWV202	Y	191
1.5	1800	208-230/460	145JP	**WV302**	5KS145KWV207	Y	191
2	3600	208-230/460	145JM	**WV203**	5KS145KWV103	Y	191
2	3600	208-230/460	145JP	**WV303**	5KS145KWV109	Y	191
2	1800	208-230/460	145JM	**WV204**	5KS145KWV203	Y	191
2	1800	208-230/460	145JP	**WV304**	5KS145KWV209	Y	191
3	3600	208-230/460	182JM	**WV205**	5KS182KWV103	Y	191
3	3600	208-230/460	182JP	**WV305**	5KS182KWV109	Y	191
3	1800	208-230/460	182JM	**WV206**	5KS182KWV203	Y	191
3	1800	208-230/460	182JP	**WV306**	5KS182KWV209	Y	191
5	3600	208-230/460	184JM	**WV207**	5KS184KWV103	Y	191
5	3600	208-230/460	184JP	**WV307**	5KS184KWV109	Y	191
5	1800	208-230/460	184JM	**WV208**	5KS184KWV203	Y	191
5	1800	208-230/460	184JP	**WV308**	5KS184KWV209	Y	191
7.5	3600	208-230/460	213JM	**WV209**	5KS213KWV103	Y	191
7.5	3600	208-230/460	213JP	**WV309**	5KS213KWV109	Y	191
7.5	1800	208-230/460	213JM	**WV210**	5KS213KWV203	Y	191
7.5	1800	208-230/460	213JP	**WV310**	5KS213KWV209	Y	191
10	3600	208-230/460	215JM	**WV211**	5KS215KWV103	Y	191
10	3600	208-230/460	215JP	**WV311**	5KS215KWV109	Y	191
10	1800	208-230/460	215JM	**WV212**	5KS215KWV203	Y	191
10	1800	208-230/460	215JP	**WV312**	5KS215KWV209	Y	191
15	3600	208-230/460	254JM	**WV213**	5KS254KWV103	Y	191
15	3600	208-230/460	254JP	**WV313**	5KS254KWV109	Y	191
15	1800	208-230/460	254JM	**WV214**	5KS254KWV203	Y	191
15	1800	208-230/460	254JP	**WV314**	5KS254KWV209	Y	191
20	3600	208-230/460	256JM	**WV215**	5KS256KWV103	Y	191
20	3600	208-230/460	256JP	**WV315**	5KS256KWV109	Y	191
20	1800	208-230/460	256JM	**WV216**	5KS256KWV203	Y	191
20	1800	208-230/460	256JP	**WV316**	5KS256KWV209	Y	191

Notes:
187 Models are only available as part of the full-container program. Contact your dealer for more details.
190 Cast Iron Model - refer to dimension pages ES.20-ES.23
191 Aluminum Model - refer to dimension pages ES.18-ES.19

Energy Saver

TEFC Severe Duty
C-Face
Close Coupled Pump



Volts: 208-230/460
HP: 1 - 75

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
25	3600	208-230/460	284JM	**WV217**	5KS284KWV113	Y	191
25	3600	208-230/460	284JP	**WV317**	5KS284KWV119	Y	191
25	1800	208-230/460	284JM	**WV218**	5KS284KWV203	Y	191
25	1800	208-230/460	284JP	**WV318**	5KS284KWV209	Y	191
30	3600	208-230/460	286JM	**WV219**	5KS286KWV113	Y	191
30	3600	208-230/460	286JP	**WV319**	5KS286KWV119	Y	191
30	1800	208-230/460	286JM	**WV220**	5KS286KWV203	Y	191
30	1800	208-230/460	286JP	**WV320**	5KS286KWV209	Y	191
40	3600	208-230/460	324JM	**WV221**	5KS324KWC113	N	190
40	3600	208-230/460	324JP	**WV321**	5KS324KWC119	Y	190
40	1800	208-230/460	324JM	**WV222**	5KS324KWC203	N	190
40	1800	208-230/460	324JP	**WV322**	5KS324KWC209	Y	190
50	3600	208-230/460	326JM	**WV223**	5KS326KWC113	N	187, 190
50	3600	208-230/460	326JP	**WV323**	5KS326KWC119	N	187, 190
50	1800	208-230/460	326JM	**WV224**	5KS326KWC203	N	187, 190
50	1800	208-230/460	326JP	**WV324**	5KS326KWC209	N	187, 190
60	3600	208-230/460	364JM	**WV225**	5KS364KWC113	N	187, 190
60	3600	208-230/460	364JP	**WV325**	5KS364KWC119	N	187, 190
60	1800	208-230/460	364JM	**WV226**	5KS364KWC203	N	187, 190
60	1800	208-230/460	364JP	**WV326**	5KS364KWC209	N	187, 190
75	3600	208-230/460	365JM	**WV227**	5KS365KWC113	N	187, 190
75	3600	208-230/460	365JP	**WV327**	5KS365KWC119	N	187, 190
75	1800	208-230/460	365JM	**WV228**	5KS365KWC203	N	187, 190
75	1800	208-230/460	365JP	**WV328**	5KS365KWC209	N	187, 190

Notes:
187 Models are only available as part of the full-container program. Contact your dealer for more details.
190 Cast Iron Model - refer to dimension pages ES.20-ES.23
191 Aluminum Model - refer to dimension pages ES.18-ES.19

Energy Saver

TEFC Severe Duty (IP55)

Dimensions



Dimensions apply to the models with the "M" catalog numbers only.
Dimensions refer to drawing on following page

Frames 140-449, Type KS, 3-Phase/Dimensions—For estimating only

Frame [19]	Approx. Net Weight (lbs)	Dimensions in Inches																				
		Shaft						Mounting [18]														
		Keyway		Key Length	N-W	U [1]	V	E	H	BA	BS	2F	2XF	A	B	C	D [3]	G	J	K	L	O
		Width	Depth																			
143T	43	0.187	0.187	1.380	2.25	0.875	2.12	2.75	0.39	2.25	2.25	5.00	4.00	6.88	5.88	13.42	3.50	0.40	1.39	2.32	6.42	7.25
145T	50																					
182T	76	0.250	0.250	1.750	2.75	1.125	2.50	3.75	0.46	2.75	2.75	5.50	4.50	8.68	6.64	15.91	4.50	0.46	1.54	2.58	7.66	9.25
184T	101																					
213T	200	0.312	0.312	2.380	3.38	1.375	3.12	4.25	0.46	3.50	3.50	7.00	5.50	9.60	8.00	20.15	5.25	0.57	1.47	3.12	9.77	10.43
215T	220																					
254T	315	0.375	0.375	2.880	4.00	1.625	3.76	5.00	0.58	4.25	5.00	10.00	8.25	11.20	11.30	25.29	6.25	0.65	1.52	3.93	12.34	12.50
256T	350																					
284TS	460	0.375	0.375	1.880	3.25	1.625	3.00	5.50	0.58	4.76	5.50	11.00	9.50	12.40	12.80	27.20	7.00	0.76	1.75	4.12	13.70	13.88
286TS	510																					
284T	460	0.500	0.500	3.250	4.62	1.875	4.38	5.50	0.58	4.76	5.50	11.00	9.50	12.40	12.80	28.58	7.00	0.76	1.75	4.12	13.70	13.88
286T	510																					
324TS	664	0.500	0.500	2.000	3.75	1.875	3.50	6.25	0.67	5.25	6.00	12.00	10.50	14.40	13.80	29.04	8.00	0.99	2.01	3.62	15.54	17.07
326TS	800																					
324T	664	0.500	0.500	3.880	5.25	2.125	5.00	6.25	0.67	5.25	6.00	12.00	10.50	14.40	13.80	30.54	8.00	0.99	2.01	3.62	15.54	17.07
326T	800																					
364TS	1122	0.500	0.500	2.000	3.75	1.875	3.50	7.00	0.69	5.88	6.13	12.25	11.25	16.00	14.40	32.76	9.00	1.09	2.26	3.40	17.00	19.02
365TS	1155																					
364T	1122	0.625	0.625	4.250	5.88	2.375	5.64	7.00	0.69	5.88	6.13	12.25	11.25	16.00	14.40	34.89	9.00	1.09	2.26	3.40	17.00	19.02
365T	1155																					
404TS	1580	0.500	0.500	2.750	4.25	2.125	4.00	8.00	0.81	6.62	6.88	13.75	12.25	18.00	16.00	36.76	10.00	1.29	2.64	4.00	19.02	21.18
405TS	1600																					
404T	1580	0.750	0.750	5.625	7.25	2.875	7.00	8.00	0.81	6.62	6.88	13.75	12.25	18.00	16.00	39.77	10.00	1.29	2.64	4.00	19.02	21.18
405T	1600																					
444TS	2100	0.625	0.625	3.000	4.75	2.375	4.50	9.00	0.81	7.50	8.25	16.50	14.50	20.00	18.80	41.87	11.00	1.49	2.64	4.97	21.37	23.94
445TS	2260																					
444T	2100	0.875	0.875	6.875	8.50	3.375	8.25	9.00	0.81	7.50	8.25	16.50	14.50	20.00	18.80	45.62	11.00	1.49	2.64	4.97	21.37	23.94
445T	2260																					
447TS	2610	0.625	0.625	3.000	4.75	2.375	4.50	9.00	0.81	7.50	12.50	25.00	20.00	20.00	27.30	50.37	11.00	1.49	2.64	8.81	25.62	23.94
449TS	3010																					
447T	2610	0.875	0.875	6.875	8.50	3.375	8.25	9.00	0.81	7.50	12.50	25.00	20.00	20.00	27.30	54.12	11.00	1.49	2.64	8.81	25.62	23.94
449T	3010																					
449LL	3010	0.875	0.875	4.500	6.75	3.375	6.50	9.00	0.81	7.50	12.50	25.00	20.00	20.00	27.30	53.37	11.00	1.49	2.64	8.70	25.62	23.94
449TS (HO)	3200	0.625	0.625	3.000	4.75	2.375	4.50	9.00	0.81	7.50	–	25.00	–	20.24	27.31	55.63	11.00	1.49	2.70	5.26	–	24.04
449T (HO)	3400	0.875	0.875	6.875	8.50	3.375	8.25									59.30						
449LL (HO)				4.500	6.75		6.50									58.52						

Notes:

1 Shaft diameters 1 1/2 inches and smaller will come within the limits of +0.000 inch, -0.0005 inch diameters 1 5/8 inches and larger +0.000 inch, -0.001 inch

3 Tolerance on "D" dimension for rigid base motors will be +0.000 inch, -0.060 inch.

18 Motor feet have 2 holes per foot allowing NEMA F-1 or F-2 assembly while maintaining critical NEMA mounting dimensions. This does not apply to 449HO frames.

19 Providing mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward, or from either side Weights shown are approximate shipping weights and should be used for estimating only

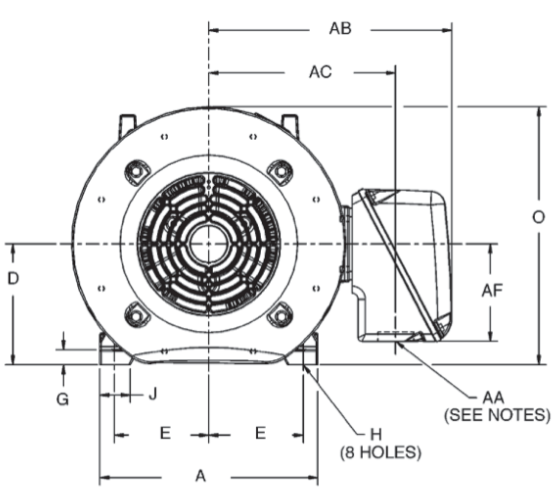
Energy Saver

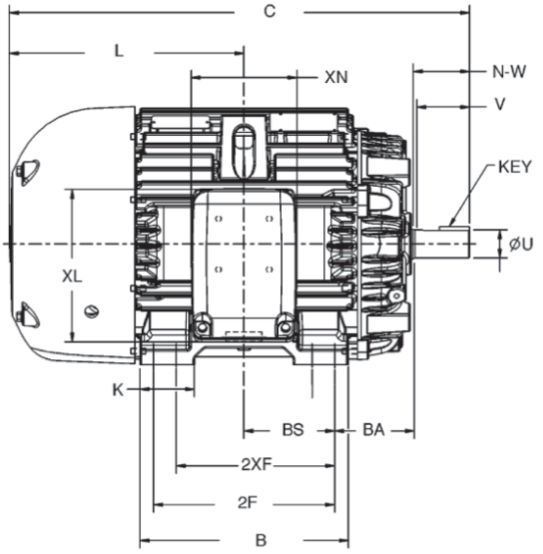
TEFC Severe Duty (IP55)

Dimensions (cont.)



Dimensions apply to the models with the "M" catalog numbers only.
Cast Iron and Aluminum Frame Dimensions on previous page





Cast Iron Frame Conduit Box Dimensions

Applies only to Monterrey produced motors that have form letters "AA" in the model number like 5KS184BAA205 and 5KS365XAA208 for example.

Dimensions for all other model numbers (cast iron or aluminum) can be found in the model's Emporium Energy

Frame	Nominal HP	Approx. Vol. (cubic in)	Dimensions in Inches					
			AA*	AB	AC	AF	XL	XN
143-145	2	32	0.75	6.62	5.12	2.50	4.30	5.40
182-184	5	32	0.75	7.82	6.32	2.50	4.30	5.40
213-215	10	55	1.00	9.50	7.42	3.50	5.78	4.16
254-256	20	140	1.25	11.68	9.12	4.59	7.37	5.37
284-286	30	140	1.50	12.44	9.88	4.59	7.37	5.37
324-326	50	346	3.00	16.13	12.43	6.44	10.14	7.00
364-365	75	346	3.00	17.07	13.37	6.44	10.14	7.00
404-405	125	700	3.00	20.48	16.22	7.00	12.13	10.50
444-449	200	700	3.00	22.00	17.74	7.00	12.13	10.50
	250-300	1260	2x 4.00	22.56	17.80	7.00	12.40	16.25

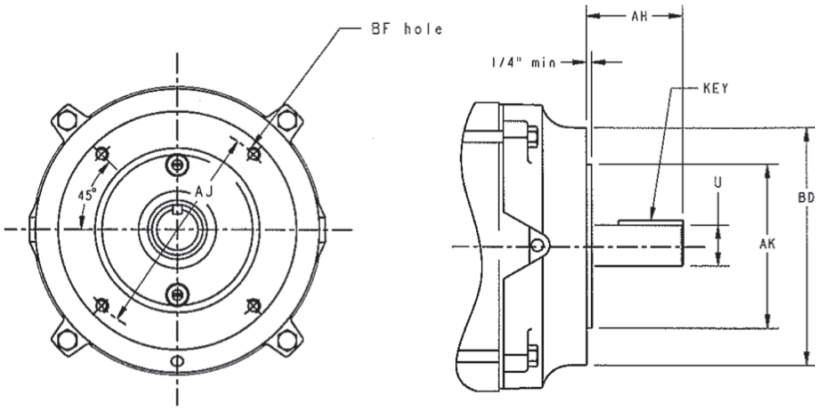
* A tapped NPT hole is provided for the conduit size listed in Column AA

Energy Saver
TEFC Severe Duty
C-Face

Dimensions (cont.)



Dimensions apply to the models with the "M" catalog numbers only.



C-Face Dimensions

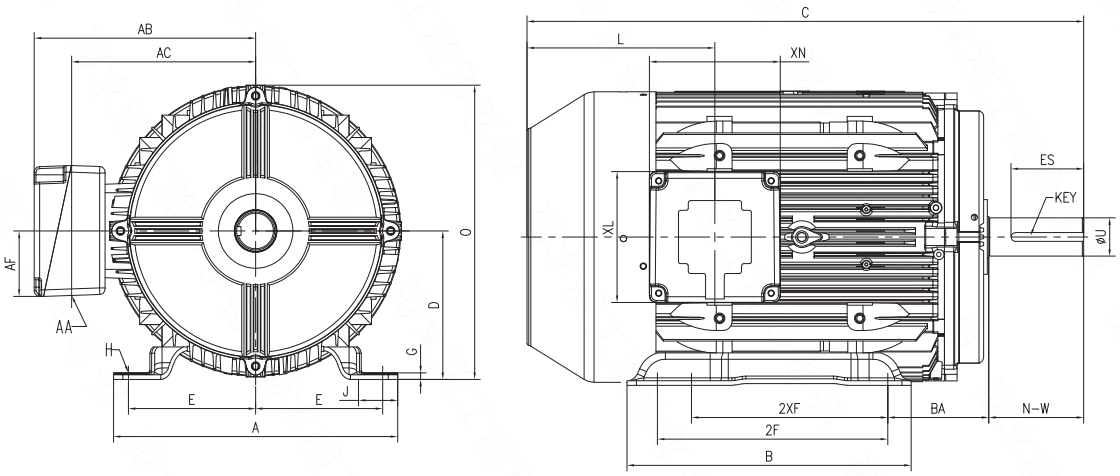
NEMA Frame	Dimensions in Inches						
	AH	AJ	AK	U	Key		
					Width	Thickness	Length
143TC-145TC	2.12	5.88	4.50	0.88	0.19	0.19	1.38
182TC-184TC	2.62	7.25	8.50	1.13	0.25	0.25	1.75
213TC-215TC	3.12	7.25	8.50	1.38	0.31	0.31	2.38
254TC-256TC	3.75	7.25	8.50	1.63	0.38	0.38	2.88
284TC-286TC	4.38	9.00	10.50	1.88	0.50	0.50	3.25

Energy Saver

TEFC Severe Duty (IP55)

Dimensions (cont.)

Dimensions apply to the models with the "BWV" or "KWV" model number form letters only.



Frame	Approx. Net Weight in lbs	Dimensions in Inches																	
		Shaft					Mounting												
		Key			N-W	U	E	H	BA	2F	2XF	A	B	C	D	G	J	L	O
		Width	Depth	Length															
143T	40	0.188	0.188	1.457	2.25	0.875	2.75	0.39	2.25	5.00	4.00	6.46	6.00	13.02	3.50	0.16	1.13	4.73	7.00
145T	42	0.188	0.188	1.457	2.25	0.875	2.75	0.39	2.25	5.00	4.00	6.46	6.00	13.02	3.50	0.16	1.13	4.73	7.00
145T	42	0.188	0.188	1.457	2.25	0.875	2.75	0.39	2.25	5.00	4.00	6.46	6.00	14.07	3.50	0.16	1.13	4.73	7.00
182T	90	0.250	0.250	1.874	2.75	1.125	3.75	0.47	2.75	5.50	4.50	8.43	6.70	16.24	4.50	0.16	1.28	5.41	8.50
184T	102	0.250	0.250	1.874	2.75	1.125	3.75	0.47	2.75	5.50	4.50	8.43	6.70	16.24	4.50	0.16	1.28	5.41	8.50
213T	130	0.312	0.312	2.528	3.38	1.375	4.25	0.47	3.50	5.50	–	10.0	9.45	18.45	5.25	0.20	1.34	6.61	10.20
215T	150	0.312	0.312	2.528	3.38	1.375	4.25	0.47	3.50	7.00	–	10.0	8.19	19.95	5.25	0.20	1.34	6.61	10.20
254T	280	0.375	0.375	3.063	4.00	1.625	5.00	0.59	4.25	10.00	8.25	11.97	12.00	23.45	6.25	0.20	1.92	7.91	12.36
256T	280	0.375	0.375	3.063	4.00	1.625	5.00	0.59	4.25	10.00	8.25	11.97	12.00	23.45	6.25	0.20	1.92	7.91	12.36
284TS	315	0.375	0.375	2.059	3.25	1.625	5.50	0.59	4.75	11.00	9.50	12.95	13.00	25.16	7.00	0.24	1.95	9.07	14.09
284T	315	0.500	0.500	3.500	4.63	1.875	5.50	0.59	4.75	11.00	9.50	12.95	13.00	26.53	7.00	0.24	1.95	9.07	14.09
286TS	368	0.375	0.375	2.059	3.25	1.625	5.50	0.59	4.75	11.00	9.50	12.95	13.00	25.16	7.00	0.24	1.95	9.07	14.09
286T	368	0.500	0.500	3.500	4.63	1.875	5.50	0.59	4.75	11.00	9.50	12.95	13.00	26.53	7.00	0.24	1.95	9.07	14.09

Conduit Box Dimensions

Frame	Nominal HP	Approx. Vol. (cubic in)	Dimensions in Inches					
			AA*	AB	AC	AF	XL	XN
143-145	2	29	0.75	5.63	4.57	2.02	4.04	4.04
182-184	5	58	0.75	6.87	5.71	2.50	5.00	5.00
213-215	10	58	1.00	7.64	6.52	2.50	5.00	5.00
254-256	20	93	1.25	9.49	7.95	2.76	5.51	5.51
284-286	30	93	1.50	10.31	8.78	2.76	5.51	5.51

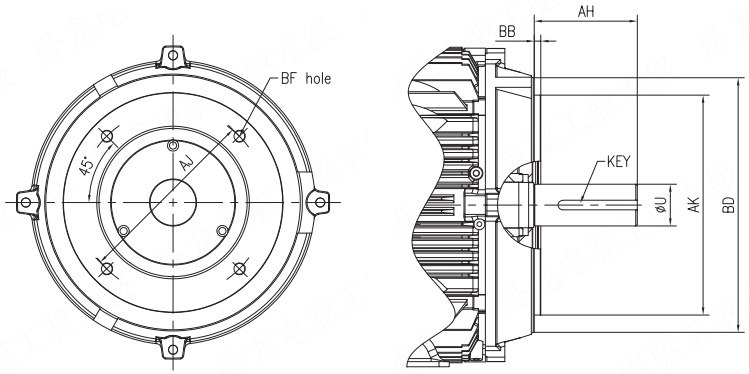
* A tapped NPT hole is provided for the conduit size listed in Column AA

Energy Saver

TEFC Severe Duty (IP55)
C-Face

Dimensions (cont.)

Dimensions apply to the models with the "BWV" or "KWV" model number form letters only.



C-Face Dimensions (Aluminum)

NEMA Frame	Dimensions in Inches							
						Key		
	AH	BB	AJ	AK	U	Width	Thickness	Length
143TC-145TC	2.12	0.125	5.88	4.50	0.875	0.188	0.188	1.457
182TC-184TC	2.76	0.250	7.25	8.50	1.125	0.250	0.250	1.874
213TC-215TC	3.34	0.250	7.25	8.50	1.375	0.312	0.312	2.528
254TC-256TC	4.00	0.250	7.25	8.50	1.625	0.375	0.375	3.063
284TSC-286TSC	4.61	0.250	9.00	10.50	1.625	0.375	0.375	2.059
284TC-286TC	4.61	0.250	9.00	10.50	1.875	0.500	0.500	3.500

Energy Saver

TEFC Severe Duty (IP55)

Dimensions (cont.)

Dimensions apply to the models with the "BWC" or "KWC" model number form letters only.
Dimensions refer to drawing on following page

NEMA 14 ~ NEMA 28

Frame	Approx. Net Weight in lbs	Dimensions in Inches																
		Shaft					Mounting											
		Key																
		Width	Depth	Length	N-W	U	E	H	BA	2F	2XF	A	B	C	D	G	J	L	O
143T	40	0.188	0.188	1.457	2.25	0.875	2.75	0.39	2.25	5.00	4.00	6.89	6.10	13.02	3.50	0.43	1.38	4.73	7.24
145T	42	0.188	0.188	1.457	2.25	0.875	2.75	0.39	2.25	5.00	4.00	6.89	6.10	13.02	3.50	0.43	1.38	4.73	7.24
145T	42	0.188	0.188	1.457	2.25	0.875	2.75	0.39	2.25	5.00	4.00	6.89	6.10	14.07	3.50	0.43	1.38	4.73	7.24
182T	90	0.250	0.250	1.874	2.75	1.125	3.75	0.47	2.75	5.50	4.50	9.06	7.17	16.24	4.50	0.72	1.57	5.41	9.04
184T	102	0.250	0.250	1.874	2.75	1.125	3.75	0.47	2.75	5.50	4.50	9.06	7.17	16.24	4.50	0.72	1.57	5.41	9.04
213T	130	0.312	0.312	2.528	3.38	1.375	4.25	0.47	3.50	5.50	5.50	10.30	8.66	19.95	5.25	0.65	1.85	6.93	10.37
215T	150	0.312	0.312	2.528	3.38	1.375	4.25	0.47	3.50	7.00	5.50	10.30	8.66	19.95	5.25	0.65	1.85	6.93	10.37
254T	280	0.375	0.375	3.063	4.00	1.625	5.00	0.59	4.25	10.00	8.25	11.97	11.80	23.45	6.25	0.87	2.17	7.91	12.36
256T	280	0.375	0.375	3.063	4.00	1.625	5.00	0.59	4.25	10.00	8.25	11.97	11.80	23.45	6.25	0.87	2.17	7.91	12.36
284T	315	0.500	0.500	3.500	4.63	1.875	5.50	0.59	4.75	11.00	9.50	13.54	12.80	26.53	7.00	0.87	2.52	9.22	14.09
286TS	368	0.375	0.375	2.059	3.25	1.625	5.50	0.59	4.75	11.00	9.50	13.54	12.80	25.16	7.00	0.87	2.52	9.22	14.09
286T	368	0.500	0.500	3.500	4.63	1.875	5.50	0.59	4.75	11.00	9.50	13.54	12.80	26.53	7.00	0.87	2.52	9.22	14.09

NEMA 32 ~ NEMA 44

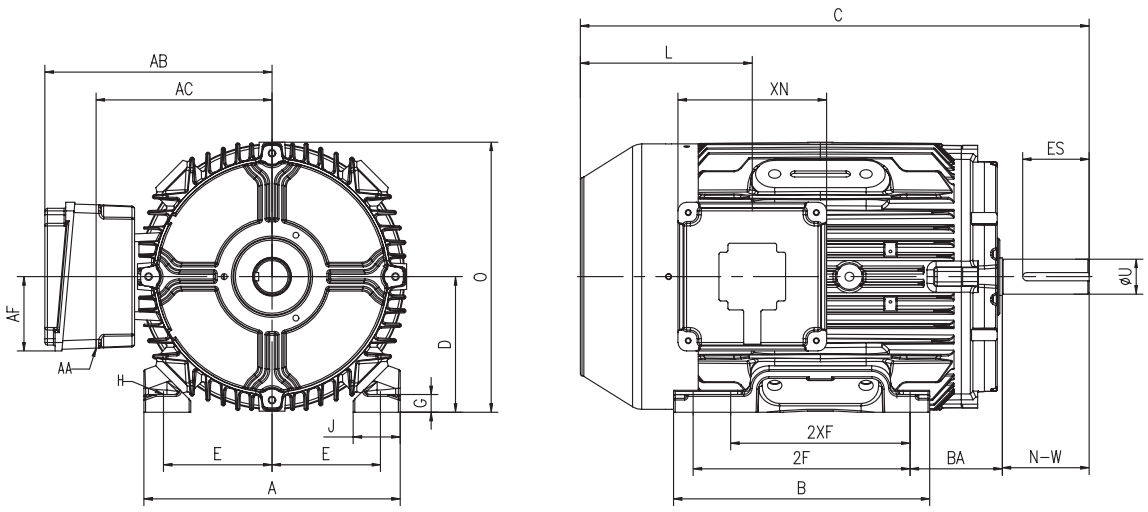
Frame	Approx. Net Weight in lbs	Dimensions in Inches																
		Shaft					Mounting											
		Key																
		Width	Depth	Length	N-W	U	E	H	BA	2F	A	B	C	D	G	J	L	O
324T	650	0.500	0.500	5.039	5.25	2.125	6.25	0.91*0.75	5.25	10.50	15.25	12.50	32.75	8.00	1.00	2.50	19.50	16.14
324TS	650	0.500	0.500	3.543	3.75	1.875	6.25	0.91*0.75	5.25	10.50	15.25	12.50	31.25	8.00	1.00	2.50	19.50	16.14
326T	750	0.500	0.500	5.039	5.25	2.125	6.25	1.42*0.75	5.25	12.00	15.25	14.50	34.05	8.00	1.00	2.50	21.00	16.14
326TS	750	0.500	0.500	3.543	3.75	1.875	6.25	1.42*0.75	5.25	12.00	15.25	14.50	32.55	8.00	1.00	2.50	21.00	16.14
364T	914	0.625	0.625	5.512	5.88	2.375	7.00	0.91*0.75	5.88	11.25	16.75	14.00	36.38	9.00	1.13	2.75	22.40	17.63
364TS	914	0.500	0.500	3.543	3.75	1.875	7.00	0.91*0.75	5.88	11.25	16.75	14.00	34.25	9.00	1.13	2.75	22.40	17.63
365T	1050	0.625	0.625	5.512	5.88	2.375	7.00	0.91*0.75	5.88	12.25	16.75	14.72	38.51	9.00	1.13	2.75	24.50	17.63
365TS	1050	0.500	0.500	3.543	3.75	1.875	7.00	0.91*0.75	5.88	12.25	16.75	14.72	36.38	9.00	1.13	2.75	24.50	17.63
404T	1384	0.750	0.750	6.890	7.25	2.875	8.00	1.10*0.94	6.62	12.25	19.00	15.00	42.10	10.00	1.13	3.13	26.30	20.00
405T	1384	0.750	0.750	6.890	7.25	2.875	8.00	1.10*0.94	6.62	13.75	19.00	16.50	42.10	10.00	1.13	3.13	26.30	20.00
405TS	1384	0.500	0.500	3.543	4.25	2.125	8.00	1.10*0.94	6.62	13.75	19.00	16.50	39.00	10.00	1.13	3.13	26.30	20.00
444T	1512	0.875	0.875	7.480	8.50	3.375	9.00	1.10*0.94	7.50	14.50	21.25	17.20	46.60	11.00	1.13	3.25	25.70	22.13
444TS	1512	0.625	0.625	4.528	4.75	2.375	9.00	1.10*0.94	7.50	14.50	21.25	17.20	42.85	11.00	1.13	3.25	25.70	22.13
445T	1896	0.875	0.875	7.480	8.50	3.375	9.00	1.10*0.94	7.50	16.50	21.25	19.20	49.63	11.00	1.38	3.25	28.50	22.13
445TS	1896	0.625	0.625	4.528	4.75	2.375	9.00	1.10*0.94	7.50	16.50	21.25	19.20	45.88	11.00	1.38	3.25	28.50	22.13
447T	2300	0.875	0.875	7.480	8.50	3.375	9.00	1.10*0.94	7.50	20.00	21.25	19.20	49.63	11.00	1.38	3.25	28.50	22.13
447TS	2300	0.625	0.625	4.528	4.75	2.375	9.00	1.10*0.94	7.50	20.00	21.25	19.20	45.88	11.00	1.38	3.25	28.50	22.13

Energy Saver

TEFC Severe Duty (IP55)

Dimensions (cont.)

Dimensions apply to the models with the "BWC" or "KWC" model number form letters only.
Dimensions on previous page

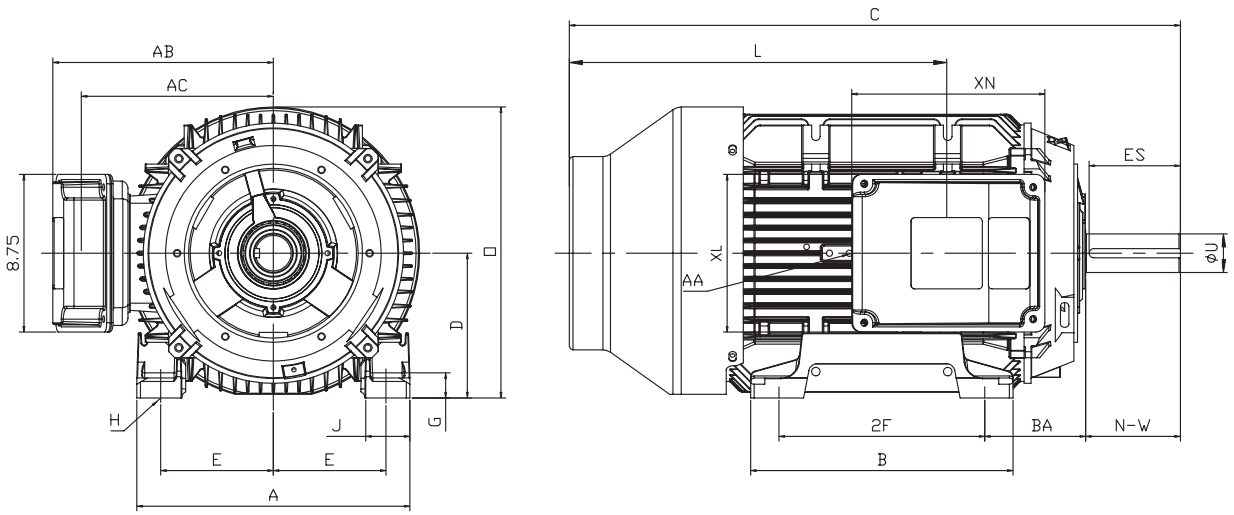


Energy Saver

TEFC Severe Duty (IP55)

Dimensions (cont.)

Dimensions apply to the models with the "BWC" or "KWC" model number form letters only.



NEMA 32 ~ NEMA 44

Frame	Approx. Net Weight in lbs	Dimensions in Inches																
		Shaft					Mounting											
		Key																
		Width	Depth	Length	N-W	U	E	H	BA	2F	A	B	C	D	G	J	L	O
324T	650	0.500	0.500	5.039	5.25	2.125	6.25	0.91*0.75	5.25	10.50	15.25	12.50	32.75	8.00	1.00	2.50	19.50	16.14
324TS	650	0.500	0.500	3.543	3.75	1.875	6.25	0.91*0.75	5.25	10.50	15.25	12.50	31.25	8.00	1.00	2.50	19.50	16.14
326T	750	0.500	0.500	5.039	5.25	2.125	6.25	1.42*0.75	5.25	12.00	15.25	14.50	34.05	8.00	1.00	2.50	21.00	16.14
326TS	750	0.500	0.500	3.543	3.75	1.875	6.25	1.42*0.75	5.25	12.00	15.25	14.50	32.55	8.00	1.00	2.50	21.00	16.14
364T	914	0.625	0.625	5.512	5.88	2.375	7.00	0.91*0.75	5.88	11.25	16.75	14.00	36.38	9.00	1.13	2.75	22.40	17.63
364TS	914	0.500	0.500	3.543	3.75	1.875	7.00	0.91*0.75	5.88	11.25	16.75	14.00	34.25	9.00	1.13	2.75	22.40	17.63
365T	1050	0.625	0.625	5.512	5.88	2.375	7.00	0.91*0.75	5.88	12.25	16.75	14.72	38.51	9.00	1.13	2.75	24.50	17.63
365TS	1050	0.500	0.500	3.543	3.75	1.875	7.00	0.91*0.75	5.88	12.25	16.75	14.72	36.38	9.00	1.13	2.75	24.50	17.63
404T	1384	0.750	0.750	6.890	7.25	2.875	8.00	1.10*0.94	6.62	12.25	19.00	15.00	42.10	10.00	1.13	3.13	26.30	20.00
405T	1384	0.750	0.750	6.890	7.25	2.875	8.00	1.10*0.94	6.62	13.75	19.00	16.50	42.10	10.00	1.13	3.13	26.30	20.00
405TS	1384	0.500	0.500	3.543	4.25	2.125	8.00	1.10*0.94	6.62	13.75	19.00	16.50	39.00	10.00	1.13	3.13	26.30	20.00
444T	1512	0.875	0.875	7.480	8.50	3.375	9.00	1.10*0.94	7.50	14.50	21.25	17.20	46.60	11.00	1.13	3.25	25.70	22.13
444TS	1512	0.625	0.625	4.528	4.75	2.375	9.00	1.10*0.94	7.50	14.50	21.25	17.20	42.85	11.00	1.13	3.25	25.70	22.13
445T	1896	0.875	0.875	7.480	8.50	3.375	9.00	1.10*0.94	7.50	16.50	21.25	19.20	49.63	11.00	1.38	3.25	28.50	22.13
445TS	1896	0.625	0.625	4.528	4.75	2.375	9.00	1.10*0.94	7.50	16.50	21.25	19.20	45.88	11.00	1.38	3.25	28.50	22.13
447T	2300	0.875	0.875	7.480	8.50	3.375	9.00	1.10*0.94	7.50	20.00	21.25	19.20	49.63	11.00	1.38	3.25	28.50	22.13
447TS	2300	0.625	0.625	4.528	4.75	2.375	9.00	1.10*0.94	7.50	20.00	21.25	19.20	45.88	11.00	1.38	3.25	28.50	22.13

Energy Saver
TEFC Severe Duty (IP55)

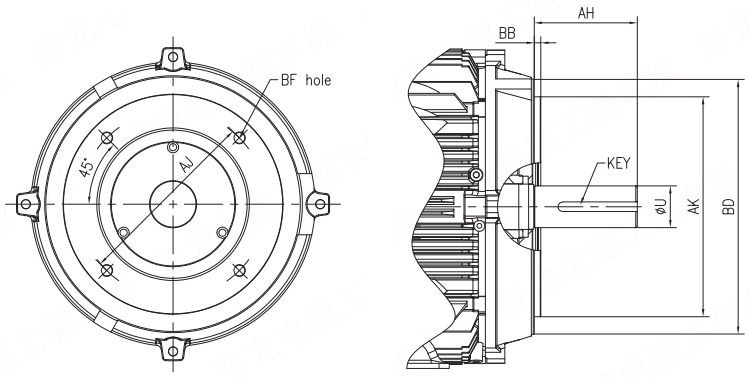
Dimensions (cont.)

Dimensions apply to the models with the "BWC" or "KWC" model number form letters only.

Conduit Box Dimensions
Dimensions refer to drawing on previous page

Frame	Nominal HP	Approx. Vol. (cubic in)	Dimensions in Inches					
			AA*	AB	AC	AF	XL	XN
143-145	2	40	0.75	6.47	5.08	2.36	4.72	4.72
182-184	5	65	0.75	7.78	6.11	2.66	5.31	5.31
213-215	10	65	1.00	8.80	7.16	2.66	5.31	5.31
254-256	20	144	1.25	10.59	8.50	3.43	6.85	6.85
284-286	30	144	1.50	11.42	9.33	3.43	6.85	6.85
324-326	50	305	2.00	12.88	10.63	–	8.75	11.38
364-365	75	402	3.00	14.25	12.00	–	8.75	15.00
404-405	100	402	3.00	15.50	13.25	–	8.75	15.00
444-447	200	806	3.00	20.75	16.00	–	13.00	20.25

* A tapped NPT hole is provided for the conduit size listed in Column AA



C-Face Dimensions (Cast Iron)

NEMA Frame	Dimensions in Inches							
						Key		
	AH	BB	AJ	AK	U	Width	Thickness	Length
143TC-145TC	2.12	0.125	5.88	4.50	0.875	0.188	0.188	1.457
182TC-184TC	2.76	0.250	7.25	8.50	1.125	0.250	0.250	1.874
213TC-215TC	3.34	0.250	7.25	8.50	1.375	0.312	0.312	2.528
254TC-256TC	4.00	0.250	7.25	8.50	1.625	0.375	0.375	3.063
284TSC-286TSC	4.61	0.250	9.00	10.50	1.625	0.375	0.375	2.059
284TC-286TC	4.61	0.250	9.00	10.50	1.875	0.500	0.500	3.500
324TSC-326TSC	3.50	0.250	11.00	12.50	1.875	0.500	0.500	3.543
324TC-326TC	5.00	0.250	11.00	12.50	2.125	0.500	0.500	5.039
364TSC-365TSC	3.50	0.250	11.00	12.50	1.875	0.500	0.500	3.543
364TC-365TC	5.62	0.250	11.00	12.50	2.375	0.625	0.625	5.512

Energy Saver

TEFC Severe Duty (IP55)

C-Face Kits

C-Face Kits for models with the "BWV" and "BWC" model number form letters only.

Frame	Kit Number
143T-145T	8BK0130003000
182T-184T	8BK0130009200
213T-215T	801030093801
254T-256T	8BK0130003200
284T-286T	8BK0130009900

XS XSD Ultra
NEMA Premium Extra Severe Duty Motors

XS.3 XSD Ultra – Extra Severe Duty
XS.3 Standard Features
XS.4 Pricing
XS.12 C-Face Pricing
XS.13 High Torque Design C Quarry Duty Pricing
XS.14 Dimensions

XS.16 XSD Ultra 841
XS.16 Standard Features
XS.17 Pricing
XS.23 C-Face Pricing

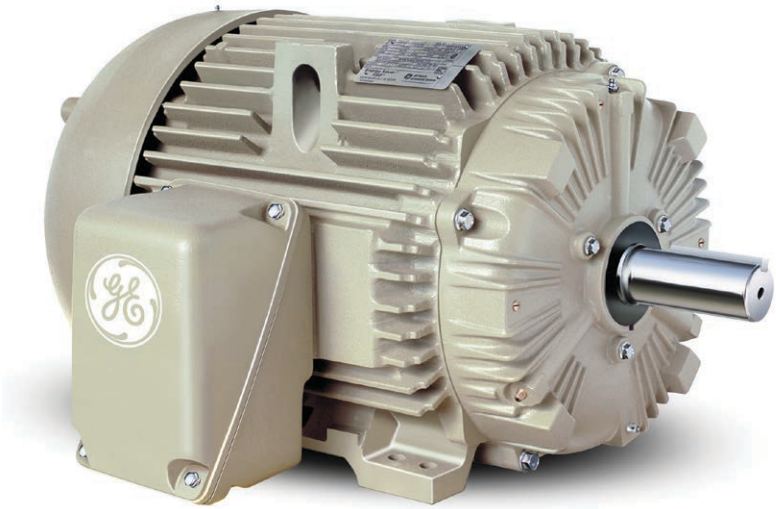
XS.25 XSD Ultra 841 Vertical C-Face NT
XS.25 Standard Features
XS.26 Pricing
XS.27 Dimensions

XS.30 XSD Ultra 661 for Heat Exchanger
XS.30 Standard Features
XS.31 Pricing
XS.32 Dimensions

XS.33 Adjustable Speed Motors
XS.33 Standard Features
XS.34 Pricing
XS.35 Dimensions
XS.38 Kits and Accessories

XS.40 XSD Ultra, XSD Ultra 841 and 661 Kits 140 to 449T

XS.44 XSD Ultra Checklist for Value



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XSD Ultra Series NEMA Premium Efficient Extra Severe Duty Motors

0.75 - 300 HP
230/460, 460, 575 V

Reliability is built in.

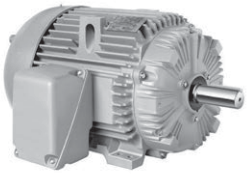
Purchasing dependable electric motors is an investment in the reliability of user operations. And system reliability means serious money to their bottom line. XSD Ultra motors have a long history of stable and reliable service across thousands of applications.

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XSD Ultra

TEFC —Extra Severe Duty (IP55)

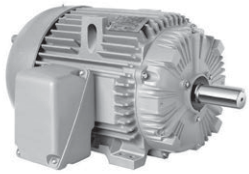
Standard Features



NEMA Frame Size	143 - 449
Poles	2, 4, 6 & 8
Horsepower Range	2-pole - 1 - 450 4-pole - 1 - 500 6-pole - 0.75 - 400 8-pole - 0.5 - 150
Voltage	230/460 V - 1 - 75 HP 460 and 575 - 1-Max HP 2300/4000 - 125-Max HP
Shaft Extension	2-pole 143-326 fr - T 284-449 fr - TS 4, 6 & 8-pole 143-449 fr - T
Agency Approvals	UL - Component and Insulation System Recognition CSA - Certification and Efficiency Verification
Division 2 Temperature Code	CSA Certified Div 2, T3 (200 C) (with some high end exceptions)
Industry Specifications	IEEE 45 Marine Duty
Warranty (months)	60 months from date of installation or 66 months from date of manufacture, whichever occurs first
Max Ambient & Altitude	40˚C & 3300 feet
Insulation Class	H
Winding Temperature Rise	80C @1.0SF Sine wave (with some high end exceptions)
Service Factor	1.15 Sine wave (with some high end exceptions)
NEMA Design	B
Insulation System	Non-Hygroscopic, Anti-Fungus, Polyester Resin, Trickle Treated, Tested to Exceed NEMA MG 1 Part 31
Inverter Capability	Variable Torque - INF:1
Efficiency	Per USA & Canada Legislation (NEMA Premium 1-200 HP)
Frame Material	Cast Iron
Frame/Conduit Box Gasket	Neoprene Rubber
End Shield Material	Cast Iron
Conduit Box Material	Cast Iron or Fabricated Steel Plate
Conduit Box Cover Gasket	Neoprene Rubber
Conduit Box Rotation	90 degree increments
Conduit Box Hole Thread	NPT
Fan Cover Material	Cast Iron
Fan	2-pole - Bi-Directional, Non-sparking Plastic (except Uni-directional Aluminum in 449 frame) 4, 6 & 8-pole - Bi-Directional, Non-sparking Plastic
Sound Power	NEMA MG 1 Part 9
Mounting	F1 (Field modifiable to F2)
Mounting Holes	2 per foot, 8 total
Lifting	4 point cast in lugs
Bearing Type	Single Shield Ball or Open Roller
Bearing L10 Life	Belted - 26,280 hrs per NEMA MG1 14.42.2 Direct Coupled - 130,000 hrs 4 Pole and above, 65,000 hrs 2 Pole
Bearing Caps	Cast Iron, gasketed
Bearing Lubricant	Polyurea
Bearing Re-Lubrication	Grease fitting & plug . Extended through the fan cover.
Bearing Protection	Steel reinforced neoprene shaft slinger
Fasteners	Hex Head, Zinc Plated
Condensation Drain	Stainless Steel T-drains at the lowest point of both end shields
Balance & Vibration	ISO 1940 Grade 1 Ball bearings - .040 peak in/sec Roller bearings - 4-pole - .0006 in pk-pk 6 & 8-pole .0009 in pk-pk
Vibration Pads	Cast in vibration pads for repeatable measurements
Nameplate	316 Stainless Steel
Paint	Epoxy Ester (Buff)
Tests	NEMA Routine only

XSD Ultra

TEFC—Extra Severe Duty (IP55)

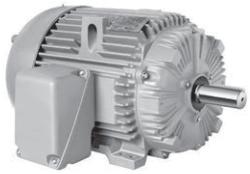


Volts: 230/460, 460, 575, 2300/4000
HP: 0.50 - 500

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
0.5	900	460	143T	**M9344**	5KS143XAA408	N		
0.5	900	575	143T	**M9345**	5KS143XAA404	N		
0.5	900	230/460	143T	**M9166**	5KS143SAA405	N	PB14A	
0.75	1200	460	143T	**M354**	5KS143XAA308	N		
0.75	1200	575	143T	**M355**	5KS143XAA308	N		
0.75	1200	230/460	143T	**M480**	5KS143SAA305	N	PB14A	
0.75	900	460	145T	**M8901**	5KS145XAA408	N		
0.75	900	575	145T	**M9346**	5KS145XAA404	N		
0.75	900	230/460	145T	**M460**	5KS145SAA405	N	PB14A	
1	3600	460	143T	**M8903**	5KS143XAA122	N		
1	3600	575	143T	**M8904**	5KS143XAA120	N		
1	3600	230/460	143T	**M462**	5KS143SAA121	N	PB14A	
1	1800	460	143T	**M352**	5KS143XAA208	N		
1	1800	575	143T	**M353**	5KS143XAA204	N		
1	1800	230/460	143T	**M482**	5KS143SAA205	N	PB14A	
1	1200	460	145T	**M363**	5KS145XAA308	N		
1	1200	575	145T	**M364**	5KS145XAA304	N		
1	1200	230/460	145T	**M484**	5KS145SAA305	N	PB14A	
1	900	460	182T	**M9888**	5KS182SAA408	N	PB18A	
1	900	575	182T	**M9874**	5KS182SAA404	N	PB18A	
1	900	230/460	182T	**M9871**	5KS182SAA405	N	PB18A	
1.5	3600	460	143T	**M8905**	5KS143XAA108	N		
1.5	3600	575	143T	**M8906**	5KS143XAA104	N		
1.5	3600	230/460	143T	**M486**	5KS143SAA105	N	PB14A	
1.5	1800	460	145T	**M359**	5KS145XAA208	N		
1.5	1800	575	145T	**M360**	5KS145XAA204	N		
1.5	1800	230/460	145T	**M492**	5KS145SAA221	N	PB14A	
1.5	1200	460	182T	**M9943**	5KS182SAA308	N	PB18A	
1.5	1200	575	182T	**M9703**	5KS182SAA304	N	PB18A	
1.5	1200	230/460	182T	**M9702**	5KS182SAA305	N	PB18A	
1.5	900	460	184T	**M9888**	5KS184SAA408	N	PB18A	
1.5	900	575	184T	**M9874**	5KS184SAA404	N	PB18A	
1.5	900	230/460	184T	**M9873**	5KS184SAA405	N	PB18A	
2	3600	460	145T	**M8907**	5KS145XAA108	N		
2	3600	575	145T	**M8908**	5KS145XAA104	N		
2	3600	230/460	145T	**M490**	5KS145SAA105	N	PB14A	
2	1800	460	145T	**M361**	5KS145XAA220	N		
2	1800	575	145T	**M362**	5KS145XAA223	N		
2	1800	230/460	145T	**M488**	5KS145SAA205	N	PB14A	
2	1200	460	184T	**M9944**	5KS184SAA308	N	PB18A	
2	1200	575	184T	**M9706**	5KS184SAA304	N	PB18A	
2	1200	230/460	184T	**M9704**	5KS184SAA305	N	PB18A	
2	900	460	213T	**M9705**	5KS213SAA408	N	PB21A	
2	900	575	213T	**M9876**	5KS213SAA404	N	PB21A	
2	900	230/460	213T	**M9875**	5KS213SAA405	N	PB21A	

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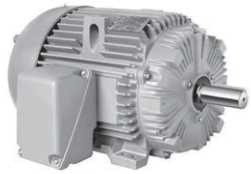


Volts: 230/460, 460, 575, 2300/4000
HP: 0.50 - 500

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
3	3600	460	182T	**M9939**	5KS182SAA108	N	PB18A	
3	3600	575	182T	**M9715**	5KS182SAA104	N	PB18A	
3	3600	230/460	182T	**M9713**	5KS182SAA105	N	PB18A	
3	1800	460	182T	**M9941**	5KS182SAA208	Y	PB18A	
3	1800	575	182T	**M9711**	5KS182SAA204	N	PB18A	
3	1800	230/460	182T	**M241**	5KS182SAA205	N	PB18A	
3	1200	460	213T	**M9111**	5KS213SAA308	N	PB21A	
3	1200	575	213T	**M9712**	5KS213SAA304	N	PB21A	
3	1200	230/460	213T	**M9142**	5KS213SAA305	N	PB21A	
3	900	460	215T	**M9708**	5KS215SAA408	N	PB21A	
3	900	575	215T	**M9878**	5KS215SAA404	N	PB21A	
3	900	230/460	215T	**M9877**	5KS215SAA405	N	PB21A	
5	3600	460	184T	**M9940**	5KS184SAA108	N	PB18A	
5	3600	575	184T	**M9722**	5KS184SAA104	N	PB18A	
5	3600	230/460	184T	**M240**	5KS184SAA105	N	PB18A	
5	1800	460	184T	**M9942**	5KS184SAA208	Y	PB18A	
5	1800	575	184T	**M9718**	5KS184SAA204	N	PB18A	
5	1800	230/460	184T	**M242**	5KS184SAA205	N	PB18A	
5	1200	460	215T	**M9112**	5KS215SAA308	N	PB21A	
5	1200	575	215T	**M9717**	5KS215SAA304	N	PB21A	
5	1200	230/460	215T	**M9143**	5KS215SAA305	N	PB21A	
5	900	460	254T	**M9719**	5KS254SAA408	N	PB25A	
5	900	575	254T	**M9880**	5KS254SAA404	N	PB25A	
5	900	230/460	254T	**M9879**	5KS254SAA405	N	PB25A	
7.5	3600	460	213T	**M990**	5KS213SAA108	Y	PB21A	
7.5	3600	575	213T	**M9728**	5KS213SAA104	N	PB21A	
7.5	3600	230/460	213T	**M9144**	5KS213SAA105	N	PB21A	
7.5	1800	460	213T	**M9911**	5KS213SAA208	Y	PB21A	
7.5	1800	575	213T	**M9730**	5KS213SAA204	N	PB21A	
7.5	1800	230/460	213T	**M9145**	5KS213SAA205	N	PB21A	
7.5	1200	460	254T	**M9113**	5KS254SAA308	N	PB25A	
7.5	1200	575	254T	**M9726**	5KS254SAA304	N	PB25A	
7.5	1200	230/460	254T	**M9146**	5KS254SAA305	N	PB25A	
7.5	900	460	256T	**M9724**	5KS256SAA408	N	PB25A	
7.5	900	575	256T	**M9882**	5KS256SAA404	N	PB25A	
7.5	900	230/460	256T	**M9881**	5KS256SAA405	N	PB25A	
10	3600	460	215T	**M991**	5KS215SAA108	Y	PB21A	
10	3600	575	215T	**M9733**	5KS215SAA104	N	PB21A	
10	3600	230/460	215T	**M9147**	5KS215SAA105	N	PB21A	
10	1800	460	215T	**M9912**	5KS215SAA208	Y	PB21A	
10	1800	575	215T	**M9738**	5KS215SAA204	N	PB21A	
10	1800	230/460	215T	**M9148**	5KS215SAA205	N	PB21A	
10	1200	460	256T	**M9114**	5KS256SAA308	N	PB25A	
10	1200	575	256T	**M9737**	5KS256SAA304	N	PB25A	
10	1200	230/460	256T	**M9149**	5KS256SAA305	N	PB25A	
10	900	460	284T	**M9736**	5KS284SAA408	N	PB28A	
10	900	575	284T	**M9884**	5KS284SAA404	N	PB28A	
10	900	230/460	284T	**M9883**	5KS284SAA405	N	PB28A	

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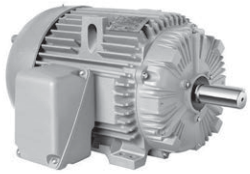


Volts: 230/460, 460, 575, 2300/4000
HP: 0.50 - 500

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
15	3600	460	254T	**M992**	5KS254SAA108	N	PB25A	
15	3600	575	254T	**M9741**	5KS254SAA104	N	PB25A	
15	3600	230/460	254T	**M9150**	5KS254SAA105	N	PB25A	
15	1800	460	254T	**M9913**	5KS254SAA208	Y	PB25A	
15	1800	575	254T	**M9745**	5KS254SAA204	N	PB25A	
15	1800	230/460	254T	**M9151**	5KS254SAA205	N	PB25A	
15	1200	460	284T	**M9115**	5KS284SAA308	N	PB28A	
15	1200	575	284T	**M9746**	5KS284SAA304	N	PB28A	
15	1200	230/460	284T	**M9152**	5KS284SAA305	N	PB28A	
15	900	460	286T	**M9742**	5KS286SAA408	N	PB28A	
15	900	575	286T	**M9886**	5KS286SAA404	N	PB28A	
15	900	230/460	286T	**M9885**	5KS286SAA405	N	PB28A	
20	3600	460	256T	**M993**	5KS256SAA108	N	PB25A	
20	3600	575	256T	**M9749**	5KS256SAA104	N	PB25A	
20	3600	230/460	256T	**M9153**	5KS256SAA105	N	PB25A	
20	1800	460	256T	**M9914**	5KS256SAA208	Y	PB25A	
20	1800	575	256T	**M9751**	5KS256SAA204	N	PB25A	
20	1800	230/460	256T	**M9154**	5KS256SAA205	N	PB25A	
20	1200	460	286T	**M9117**	5KS286SAA308	N	PB28A	
20	1200	575	286T	**M9755**	5KS286SAA304	N	PB28A	
20	1200	230/460	286T	**M9155**	5KS286SAA305	N	PB28A	
20	900	460	324T	**M9748**	5KS324SAA408	N	A761	
20	900	575	324T	**M8950**	5KS324SAA404	N	A761	
20	900	230/460	324T	**M9173**	5KS324SAA405	N	A761	
25	3600	460	284TS	**M994**	5KS284SAA118	N	PB28A	
25	3600	460	284T	**M9175**	5KS284SAA108	N	PB28A	
25	3600	575	284TS	**M9838**	5KS284SAA114	N	PB28A	
25	3600	575	284T	**M9176**	5KS284SAA104	N	PB28A	
25	3600	230/460	284TS	**M9156**	5KS284SAA115	Y	PB28A	
25	3600	230/460	284T	**M9174**	5KS284SAA105	N	PB28A	
25	1800	460	284T	**M9935**	5KS284SAA208	Y	PB28A	
25	1800	575	284T	**M9759**	5KS284SAA204	N	PB28A	
25	1800	230/460	284T	**M9157**	5KS284SAA205	Y	PB28A	
25	1200	460	324T	**M9119**	5KS324SAA308	N	A761	
25	1200	575	324T	**M9758**	5KS324SAA304	N	A761	
25	1200	230/460	324T	**M9158**	5KS324SAA305	N	A761	
25	900	460	326T	**M9761**	5KS326SAA408	N	A761	
25	900	575	326T	**M9762**	5KS326SAA404	N	A761	
25	900	230/460	326T	**M9177**	5KS326SAA405	N	A761	
30	3600	460	286TS	**M995**	5KS286SAA118	Y	PB28A	
30	3600	460	286T	**M9179**	5KS286SAA108	N	PB28A	
30	3600	575	286TS	**M9828**	5KS286SAA114	N	PB28A	
30	3600	575	286T	**M9180**	5KS286SAA104	N	PB28A	
30	3600	230/460	286TS	**M9159**	5KS286SAA115	N	PB28A	
30	3600	230/460	286T	**M9178**	5KS286SAA105	N	PB28A	
30	1800	460	286T	**M9937**	5KS286SAA208	Y	PB28A	
30	1800	575	286T	**M9764**	5KS286SAA204	N	PB28A	
30	1800	230/460	286T	**M9160**	5KS286SAA205	Y	PB28A	

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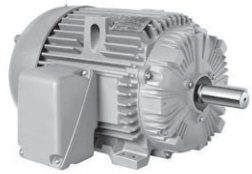


Volts: 230/460, 460, 575, 2300/4000
HP: 0.50 - 500

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
30	1200	460	326T	**M9122**	5KS326SAA308	Y	A761	
30	1200	575	326T	**M9834**	5KS326SAA304	N	A761	
30	1200	230/460	326T	**M9161**	5KS326SAA305	N	A761	
30	900	460	364T	**M9767**	5KS364SAA408	N	A763	
30	900	575	364T	**M9766**	5KS364SAA404	N	A763	
30	900	230/460	364T	**M9181**	5KS364SAA405	N	A763	
40	3600	460	324TS	**M996**	5KS324SAA118	Y	A761	
40	3600	460	324T	**M9820**	5KS324SAA108	N	A761	
40	3600	575	324TS	**M9829**	5KS324SAA114	N	A761	
40	3600	575	324T	**M9183**	5KS324SAA104	N	A761	
40	3600	230/460	324TS	**M9162**	5KS324SAA115	N	A761	
40	3600	230/460	324T	**M9182**	5KS324SAA105	N	A761	
40	1800	460	324TS	**M9916**	5KS324SAA218	N	A761	
40	1800	460	324T	**M9915**	5KS324SAA208	Y	A761	
40	1800	575	324T	**M9768**	5KS324SAA204	N	A761	
40	1800	230/460	324T	**M9163**	5KS324SAA205	Y	A761	
40	1200	460	364T	**M9124**	5KS364SAA308	N	A763	
40	1200	575	364T	**M9835**	5KS364SAA304	N	A763	
40	1200	230/460	364T	**M9184**	5KS364SAA305	N	A763	
40	900	460	365T	**M9770**	5KS365SAA408	N	A763	
40	900	575	365T	**M9534**	5KS365SAA404	N	A763	
40	900	230/460	365T	**M9185**	5KS365SAA405	N	A763	
50	3600	460	326TS	**M997**	5KS326SAA118	N	A761	
50	3600	460	326T	**M9823**	5KS326SAA108	N	A761	
50	3600	575	326TS	**M9839**	5KS326SAA114	N	A761	
50	3600	575	326T	**M9187**	5KS326SAA104	N	A761	
50	3600	230/460	326TS	**M9164**	5KS326SAA115	N	A761	
50	3600	230/460	326T	**M9186**	5KS326SAA105	N	A761	
50	1800	460	326TS	**M9918**	5KS326SAA218	N	A761	
50	1800	460	326T	**M9917**	5KS326SAA208	Y	A761	
50	1800	575	326T	**M9765**	5KS326SAA204	N	A761	
50	1800	230/460	326T	**M9165**	5KS326SAA205	Y	A761	
50	1200	460	365T	**M9126**	5KS365SAA308	N	A763	
50	1200	575	365T	**M9775**	5KS365SAA304	N	A763	
50	1200	230/460	365T	**M9188**	5KS365SAA305	N	A763	
50	900	460	404T	**M9773**	5KS404SAA408	N	A765	
50	900	575	404T	**M9535**	5KS404SAA404	N	A765	
50	900	230/460	404T	**M9189**	5KS404SAA405	N	A765	
60	3600	460	364TS	**M998**	5KS364SAA118	N	A763	
60	3600	575	364TS	**M9847**	5KS364SAA114	N	A763	
60	3600	230/460	364TS	**M9190**	5KS364SAA115	N	A763	
60	3600	230/460	364T	**M9701**	5KS364SAA105	N	A763	
60	1800	460	364TS	**M9921**	5KS364SAA218	N	A763	
60	1800	460	364T	**M9919**	5KS364SAA208	Y	A763	
60	1800	575	364T	**M9776**	5KS364SAA204	N	A763	
60	1800	230/460	364T	**M9191**	5KS364SAA205	N	A763	

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TEFC—Extra Severe Duty (IP55)



Volts: 230/460, 460, 575, 2300/4000
HP: 0.50 - 500

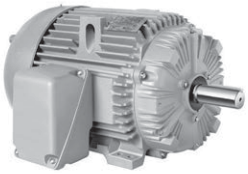
HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
60	1200	460	404T	**M9128**	5KS404SAA308	N	A765	
60	1200	575	404T	**M9837**	5KS404SAA304	N	A765	
60	1200	230/460	404T	**M9192**	5KS404SAA305	N	A765	
60	900	460	405T	**M9778**	5KS405SAA408	N	A765	
60	900	575	405T	**M9536**	5KS405SAA404	N	A765	
60	900	230/460	405T	**M9193**	5KS405SAA405	N	A765	
75	3600	460	365TS	**M999**	5KS365SAA118	Y	A763	
75	3600	575	365TS	**M9830**	5KS365SAA114	N	A763	
75	3600	230/460	365TS	**M9194**	5KS365SAA115	N	A763	
75	3600	230/460	365T	**M9707**	5KS365SAA105	N	A763	
75	1800	460	365TS	**M9923**	5KS365SAA218	N	A763	
75	1800	460	365T	**M9922**	5KS365SAA208	Y	A763	
75	1800	575	365T	**M9781**	5KS365SAA204	N	A763	
75	1800	230/460	365T	**M9195**	5KS365SAA205	Y	A763	
75	1200	460	405T	**M9131**	5KS405SAA308	N	A765	
75	1200	460	405T	**M9355**	5KS405XAA370	N		98
75	1200	575	405T	**M9868**	5KS405SAA304	N	A765	
75	1200	575	405T	**M9481**	5KS405XAA379	N		98
75	1200	230/460	405T	**M9196**	5KS405SAA305	N	A765	
75	900	460	444T	**M9780**	5KS444SAA408	N	A767	
75	900	575	444T	**M9537**	5KS444SAA404	N	A767	
75	900	230/460	444T	**M9197**	5KS444SAA405	N	A767	
100	3600	460	405TS	**M9510**	5KS405SAA118	N	A766	
100	3600	460	405T	**M9709**	5KS405SAA108	N	A765	
100	3600	575	405TS	**M9831**	5KS405SAA114	N	A766	
100	1800	460	405TS	**M9925**	5KS405SAA218	N	A766	
100	1800	460	405T	**M9924**	5KS405SAA208	Y	A765	
100	1800	460	405T	**M9356**	5KS405XAA2088	Y		98
100	1800	575	405T	**M9779**	5KS405SAA204	N	A765	
100	1800	575	405T	**M9484**	5KS405XAA2122	N		98
100	1200	460	444T	**M9133**	5KS444SAA308	N	A767	
100	1200	460	444T	**M9357**	5KS444XAA366	Y	A767	98
100	1200	575	444T	**M9846**	5KS444SAA304	N	A767	
100	1200	575	444T	**M9533**	5KS444XAA373	N	A767	98
100	900	460	445T	**M9782**	5KS445SAA408	N	A767	
100	900	575	445T	**M8953**	5KS445SAA404	N	A767	
125	3600	460	444TS	**M9511**	5KS444SAA118	N	A768	
125	3600	575	444TS	**M9538**	5KS444SAA114	N	A768	
125	3600	2300/4000	449TS	**M9800**	5KS449SAA1053	N	A768	115, 125, 185
125	1800	460	444TS	**M9927**	5KS444SAA218	N	A768	
125	1800	460	444T	**M9926**	5KS444SAA208	Y	A767	
125	1800	460	444T	**M9358**	5KS444XAA2028	Y	A767	98

Notes:

98 For belted load only. Roller bearing on drive-end.
115 Meets 200°C AIT at 1.0 SF
125 Offset Core F1 only. Not convertible to F2
185 MV models are Class F insulation

XSD Ultra

TEFC—Extra Severe Duty (IP55)



Volts: 230/460, 460, 575, 2300/4000
HP: 0.50 - 500

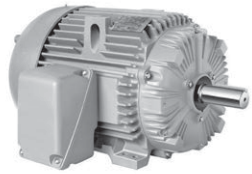
HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
125	1800	575	444T	**M9832**	5KS444SAA204	N	A767	
125	1800	575	444T	**M9539**	5KS444XAA2058	N	A767	98
125	1800	2300/4000	449T	**M9801**	5KS449SAA2142	N	A767	97, 125, 185
125	1200	460	445T	**M9135**	5KS445SAA308	N	A767	
125	1200	460	445T	**M9359**	5KS445XAA371	Y	A767	98
125	1200	575	445T	**M9870**	5KS445SAA304	N	A767	
125	1200	575	445T	**M9595**	5KS445XAA380	N	A767	98
125	1200	2300/4000	449T	**M9802**	5KS449SAA3016	N	A767	115, 125, 185
125	900	460	447T	**M9784**	5KS447SAA408	N	A767	
125	900	575	447T	**M8954**	5KS447SAA404	N	A767	
150	3600	460	445TS	**M9512**	5KS445SAA118	Y	A768	
150	3600	575	445TS	**M8955**	5KS445SAA114	N	A768	
150	3600	2300/4000	449TS	**M9803**	5KS449SAA1051	Y	A768	62, 115, 125, 185
150	1800	460	445TS	**M9929**	5KS445SAA218	N	A768	
150	1800	460	445T	**M9928**	5KS445SAA208	Y	A767	
150	1800	460	445T	**M9360**	5KS445XAA2054	Y	A767	98
150	1800	575	445T	**M9854**	5KS445SAA204	N	A767	
150	1800	575	445T	**M9599**	5KS445XAA2083	N	A767	98
150	1800	2300/4000	449T	**M9804**	5KS449SAA2143	Y	A767	115, 125, 185
150	1200	460	447T	**M9137**	5KS447SAA308	N	A767	
150	1200	460	447T	**M9361**	5KS447XAA363	Y	A767	98
150	1200	575	447T	**M9869**	5KS447SAA304	N	A767	
150	1200	575	447T	**M9386**	5KS447XAA374	N	A767	98
150	1200	2300/4000	449T	**M9805**	5KS449SAA3017	N	A767	115, 125, 185
150	900	460	449T	**M9785**	5KS449SAA408	N	A767	
150	900	575	449T	**M8956**	5KS449SAA404	N	A767	
200	3600	460	447TS	**M9961**	5KS447SAA118	Y	A768	
200	3600	575	447TS	**M8957**	5KS447SAA114	N	A768	66
200	3600	2300/4000	449TS	**M9806**	5KS449SAA1049	N	A768	62, 115, 125, 185
200	1800	460	445T	**M9908**	5KS445SAA209	N	A767	
200	1800	460	447T	**M9991**	5KS447SAA201	Y	A767	98
200	1800	460	447T	**M9958**	5KS447SAA208	Y	A767	
200	1800	575	447T	**M9959**	5KS447SAA204	N	A767	
200	1800	575	447T	**M9363**	5KS447XAA2045	N	A767	98
200	1800	2300/4000	449T	**M9807**	5KS449SAA2139	Y	A767	97, 125, 185
200	1200	460	449T	**M9139**	5KS449SAA308	N	A767	
200	1200	460	449T	**M9198**	5KS449SAA382	N	A767	98
200	1200	460	449LL	**M9141**	5KS449SAA319	N	A767	

Notes:

62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
97 Does not meet 200°C AIT at 1.0 SF - 215°C AIT and above only
98 For belted load only. Roller bearing on drive-end.
115 Meets 200°C AIT at 1.0 SF
125 Offset Core F1 only. Not convertible to F2
185 MV models are Class F insulation

XSD Ultra

TEFC—Extra Severe Duty (IP55)



Volts: 230/460, 460, 575, 2300/4000
HP: 0.50 - 500

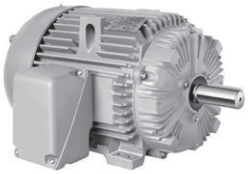
HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
200	1200	575	449T	**M9845**	5KS449SAA304	N	A767	
200	1200	575	449T	**M9365**	5KS449XAA351	N	A767	98
200	1200	2300/4000	449T	**M9808**	5KS449SAA3018	N	A767	97, 125, 149, 185
250	3600	460	449TS	**M9514**	5KS449SAA118	N	A768	66
250	3600	460	449TS	**M9996**	5KS449SAA146	N	A768	62
250	3600	575	449TS	**M8959**	5KS449SAA122	N	A768	66
250	3600	575	449TS	**M9394**	5KS449SAA1007	N	A768	62
250	3600	2300/4000	449TS	**M9809**	5KS449SAA1054	N	A768	62, 97, 125, 185
250	1800	460	449T	**M9988**	5KS449SAA201	Y	A767	
250	1800	460	449T	**M9933**	5KS449SAA208	N	A767	98
250	1800	575	449T	**M9989**	5KS449SAA202	N	A767	
250	1800	575	449T	**M9369**	5KS449XAA288	N	A767	98
250	1800	2300/4000	449T	**M9810**	5KS449SAA2141	Y	A767	35, 125, 185
250	1200	460	449T	**M8963**	5KS449SAA301	N	A767	
250	1200	460	449T	**M9370**	5KS449XAA352	Y	A767	98
250	1200	575	449T	**M9396**	5KS449SAA385	N	A767	
250	1200	575	449T	**M9371**	5KS449XAA353	N	A767	98
250	1200	2300/4000	449T	**M9850**	5KS449SAH339	N	A767	35, 149, 175, 185
250	1200	2300/4000	449T	**M9852**	5KS449SAH340	N	A767	35, 98, 149, 175, 185
300	3600	460	449TS	**M8960**	5KS449SAA123	N	A768	66
300	3600	460	449TS	**M9398**	5KS449SAA1008	N	A768	62
300	3600	575	449TS	**M8961**	5KS449SAA124	N	A768	66
300	3600	575	449TS	**M9399**	5KS449SAA1009	N	A768	62
300	3600	2300/4000	449TS	**M9818**	5KS449SAH129	N	A768	66, 115, 125, 175, 178, 185
300	3600	2300/4000	449TS	**M9819**	5KS449SAH132	N	A768	62, 115, 125, 175, 178, 185
300	1800	460	449T	**M9990**	5KS449SAA212	Y	A767	
300	1800	460	449T	**M9906**	5KS449SAA209	N	A767	98
300	1800	575	449T	**M9907**	5KS449SAA254	N	A767	
300	1800	575	449T	**M9376**	5KS449XAA290	N	A767	98
300	1800	2300/4000	449T	**M9821**	5KS449SAH223	N	A767	97, 125, 149, 175, 185

Notes:

35 Does not meet 200C AIT (T3) - 230C AIT (T2C) and above only
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
97 Does not meet 200°C AIT at 1.0 SF - 215°C AIT and above only
98 For belted load only. Roller bearing on drive-end.
115 Meets 200°C AIT at 1.0 SF
125 Offset Core F1 only. Not convertible to F2
149 Class F rise @ 1.0 SF only
175 Special long “high output frame”. Refer to the 449HO rows in the dimensions table. This frame is not suitable for F1 to F2 conversion.
178 NEMA Design A Code H
179 NEMA Design A Code J
180 NEMA Design A Code K
181 NEMA Design A Code L
185 MV models are Class F insulation

XSD Ultra

TEFC—Extra Severe Duty (IP55)



Volts: 230/460, 460, 575, 2300/4000
HP: 0.50 - 500

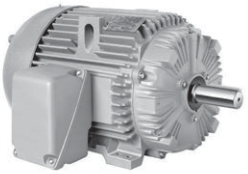
HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	C-Face Kit	Notes
300	1200	460	449T	**M9827**	5KS449SAH334	N	A767	115, 175
300	1200	460	449T	**M9833**	5KS449SAH335	N	A767	98, 115, 175
300	1200	460	449T	**M9897**	5KS449SAH345F2	Y	A767	98, 115, 175
350	3600	460	449TS	**M9812**	5KS449SAH127	N	A768	66, 115, 175
350	3600	460	449TS	**M9813**	5KS449SAH128	N	A768	62, 115, 175
350	1800	460	449T	**M9840**	5KS449SAH225	N	A767	115, 175, 178
350	1800	460	449T	**M9814**	5KS449SAH222	N	A767	98, 115, 175, 178
350	1800	2300/4000	449T	**M9836**	5KS449SAH224	N	A767	97, 125, 149, 175, 178, 185
350	1200	460	449T	**M9817**	5KS449SAH331	N	A767	115, 149, 175
350	1200	460	449T	**M9811**	5KS449SAH325	N	A767	98, 115, 149, 175
350	1200	460	449T	**M9853**	5KAF449SAH328F2	Y	A767	98, 146, 149, 175, 186
400	3600	460	449TS	**M9815**	5KS449SAH131	N	A768	66, 115, 149, 175
400	3600	460	449TS	**M9816**	5KS449SAH130	N	A768	62, 115, 149, 175
400	1800	460	449T	**M9825**	5KS449SAH229	N	A767	175
400	1800	460	449T	**M9824**	5KS449SAH228	N	A767	98, 175
400	1200	460	449T	**M9841**	5KS449SAH338	N	A767	115, 149, 175, 180
400	1200	460	449T	**M9842**	5KS449SAH337	N	A767	98, 115, 149, 175, 180
400	1200	460	449T	**M9855**	5KAF449SAH330F2	Y	A767	98, 146, 149, 175, 186
450	3600	460	449TS	**M9843**	5KS449SAH134	N	A768	66, 97, 149, 175, 178
450	3600	460	449TS	**M9844**	5KS449SAH135	N	A768	66, 97, 149, 175, 178
450	1800	460	449T	**M9822**	5KS449SAH226	N	A767	175
450	1800	460	449T	**M9826**	5KS449SAH230	N	A767	98, 175
500	1800	460	449T	**M9848**	5KS449SAH232	N	A767	115, 175, 179
500	1800	460	449T	**M9849**	5KS449SAH231	N	A767	98, 115, 175, 179

Notes:

62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
97 Does not meet 200°C AIT at 1.0 SF - 215°C AIT and above only
98 For belted load only. Roller bearing on drive-end.
115 Meets 200°C AIT at 1.0 SF
125 Offset Core F1 only. Not convertible to F2
146 Does not meet 200C AIT (T3) - 260C AIT (T2B) and above only
149 Class F rise @ 1.0 SF only
175 Special long “high output frame”. Refer to the 449HO rows in the dimensions table. This frame is not suitable for F1 to F2 conversion.
178 NEMA Design A Code H
179 NEMA Design A Code J
180 NEMA Design A Code K
181 NEMA Design A Code L
185 MV models are Class F insulation
186 Special design for use on inverters only. Not good for direct-on-line.

XSD Ultra

TEFC—Extra Severe Duty (IP55)
C-Face

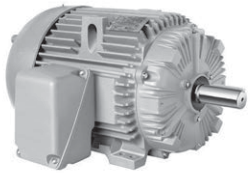


Volts: 230/460, 460
HP: 0.75 - 50

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
0.75	1200	230/460	143TC	**M496**	5KS143SAA302	N	
1	1800	230/460	143TC	**M497**	5KS143SAA202	N	
1	1800	460	143TC	**M478**	5KS143SAA200	N	
1	1200	230/460	145TC	**M498**	5KS145SAA302	N	
1.5	1800	230/460	145TC	**M499**	5KS145SAA224	N	
1.5	1800	460	145TC	**M479**	5KS145SAA200	N	
1.5	1200	460	182TC	**M9946**	5KS182SAA300	N	
2	1800	230/460	145TC	**M500**	5KS145SAA202	N	
2	1200	460	184TC	**M9948**	5KS184SAA300	N	
3	3600	460	182TC	**M9945**	5KS182SAA100	Y	
3	1800	460	182TC	**M9889**	5KS182SAA200	Y	
3	1200	460	213TC	**M9950**	5KS213SAA300	N	
5	3600	460	184TC	**M9947**	5KS184SAA100	N	
5	1800	460	184TC	**M9890**	5KS184SAA200	Y	
5	1200	460	215TC	**M9952**	5KS215SAA300	N	
7.5	3600	460	213TC	**M9949**	5KS213SAA100	N	
7.5	1800	460	213TC	**M9891**	5KS213SAA200	Y	
7.5	1200	460	254TC	**M9954**	5KS254SAA300	N	
10	3600	460	215TC	**M9951**	5KS215SAA100	N	
10	1800	460	215TC	**M9892**	5KS215SAA200	N	
10	1200	460	256TC	**M9956**	5KS256SAA300	N	
15	3600	460	254TC	**M9953**	5KS254SAA100	N	
15	1800	460	254TC	**M9893**	5KS254SAA200	N	
15	1200	460	284TC	**M9901**	5KS284SAA300	N	
20	3600	460	256TC	**M9955**	5KS256SAA100	N	
20	1800	460	256TC	**M9894**	5KS256SAA200	Y	
20	1200	460	286TC	**M9902**	5KS286SAA300	N	
25	3600	460	284TSC	**M9903**	5KS284SAA100	N	
25	1800	460	284TC	**M9895**	5KS284SAA200	N	
30	3600	460	286TSC	**M9904**	5KS286SAA100	N	
30	1800	460	286TC	**M9896**	5KS286SAA200	Y	
40	3600	460	324TSC	**M8964**	5KS324SAA152	N	
40	1800	460	324TC	**M8965**	5KS324SAA2007	N	
50	3600	460	326TSC	**M8966**	5KS326SAA146	N	
50	1800	460	326TC	**M8967**	5KS326SAA271	N	

XSD Ultra

TEFC—Extra Severe Duty (IP55)
NEMA Design C (KGS Plus)—High Torque
Quarry Duty



Volts: 460
HP: 25 - 500

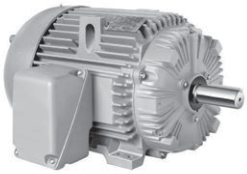
HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
25	1800	460	284T	**M8801**	5KGS284SAA208	N	100
25	1200	460	324T	**M8980**	5KGS324SAA308	N	100
30	1800	460	286T	**M8802**	5KGS286SAA208	N	100
30	1200	460	326T	**M8981**	5KGS326SAA308	N	100
40	1800	460	324T	**M8990**	5KGS324SAA208	N	100
40	1200	460	364T	**M8982**	5KGS364SAA320	N	98, 99
50	1800	460	326T	**M8991**	5KGS326SAA208	N	100
50	1200	460	365T	**M8983**	5KGS365SAA320	N	98, 99
60	1800	460	364T	**M8902**	5KGS364SAA208	N	100
60	1800	460	364T	**M8992**	5KGS364SAA220	N	98, 99
60	1200	460	404T	**M8984**	5KGS404SAA320	N	98, 99
75	1800	460	365T	**M8930**	5KGS365SAA208	N	100
75	1800	460	365T	**M8993**	5KGS365SAA220	N	98, 99
75	1200	460	405T	**M8985**	5KGS405SAA321	N	98, 99
100	1800	460	405T	**M8806**	5KGS405SAA208	N	100
100	1800	460	405T	**M8994**	5KGS405SAA221	N	98, 99
100	1200	460	444T	**M8986**	5KGS444SAA320	N	98, 99
125	1800	460	444T	**M8970**	5KGS444SAA208	N	100
125	1800	460	444T	**M8995**	5KGS444SAA220	N	98, 99
125	1200	460	445T	**M8987**	5KGS445SAA320	N	98, 99
150	1800	460	445T	**M8803**	5KGS445SAA208	N	100
150	1800	460	445T	**M8996**	5KGS445SAA220	N	98, 99
150	1200	460	447T	**M8988**	5KGS447SAA320	N	98, 99
200	1800	460	447T	**M8804**	5KGS447SAA208	N	100
200	1800	460	447T	**M8997**	5KGS447SAA220	N	98, 99
200	1200	460	449T	**M8989**	5KGS449SAA321	N	98, 99
250	1800	460	449T	**M8805**	5KGS449SAA208	N	100
250	1800	460	449T	**M8998**	5KGS449SAA222	N	98, 99
250	1200	460	5011LB	**Q5364**	5KGS511SAA339	N	98, 99
300	1800	460	449T	**M8999**	5KGS449SAA224	N	98, 99
300	1200	460	5011LB	**Q5365**	5KGS511SAA340	N	98, 99
350	1800	460	509LB	**Q5369**	5KGS509SAA226	N	98, 99
350	1200	460	5011LB	**Q5366**	5KGS511SAA338	N	98, 99
400	1800	460	509LB	**Q5370**	5KGS509SAA225	N	98, 99
400	1200	460	5011LB	**Q5367**	5KGS511SAA336	N	98, 99
450	1800	460	5011LB	**Q5371**	5KGS511SAA226	N	98, 99
500	1800	460	5011LB	**Q5368**	5KGS511SAA224	N	98, 99

Notes:
98 For belted load only. Roller bearing on drive-end.
99 NEMA Design C: High Torque and 4142 shaft material
100 NEMA Design C: High Torque

XSD Ultra

TEFC—Extra Severe Duty

Dimensions



Dimensions refer to drawing on following page

Cast Iron Construction/Frames 140-449, Type KS, 3-Phase/Dimensions—For estimating only

Frame [19]	Approx. Net Weight (lbs)	Dimensions in Inches																				
		Shaft						Mounting [18]														
		Keyway		Key																		
		Width	Depth	Length	N-W	U [1]	V	E	H	BA	BS	2F	2XF	A	B	C	D [3]	G	J	K	L	O
143T	43	0.187	0.187	1.380	2.25	0.875	2.12	2.75	0.39	2.25	2.25	5.00	4.00	6.88	5.88	13.42	3.50	0.40	1.39	2.32	6.42	7.25
145T	50																					
182T	76	0.250	0.250	1.750	2.75	1.125	2.50	3.75	0.46	2.75	2.75	5.50	4.50	8.68	6.64	15.91	4.50	0.46	1.54	2.58	7.66	9.25
184T	101																					
213T	200	0.312	0.312	2.380	3.38	1.375	3.12	4.25	0.46	3.50	3.50	7.00	5.50	9.60	8.00	20.15	5.25	0.57	1.47	3.12	9.77	10.43
215T	220																					
254T	315	0.375	0.375	2.880	4.00	1.625	3.76	5.00	0.58	4.25	5.00	10.00	8.25	11.20	11.30	25.29	6.25	0.65	1.52	3.93	12.34	12.50
256T	350																					
284TS	460	0.375	0.375	1.880	3.25	1.625	3.00	5.50	0.58	4.76	5.50	11.00	9.50	12.40	12.80	27.20	7.00	0.76	1.75	4.12	13.70	13.88
286TS	510																					
284T	460	0.500	0.500	3.250	4.62	1.875	4.38	5.50	0.58	4.76	5.50	11.00	9.50	12.40	12.80	28.58	7.00	0.76	1.75	4.12	13.70	13.88
286T	510																					
324TS	664	0.500	0.500	2.000	3.75	1.875	3.50	6.25	0.67	5.25	6.00	12.00	10.50	14.40	13.80	29.04	8.00	0.99	2.01	3.62	15.54	17.07
326TS	800																					
324T	664	0.500	0.500	3.880	5.25	2.125	5.00	6.25	0.67	5.25	6.00	12.00	10.50	14.40	13.80	30.54	8.00	0.99	2.01	3.62	15.54	17.07
326T	800																					
364TS	1122	0.500	0.500	2.000	3.75	1.875	3.50	7.00	0.69	5.88	6.13	12.25	11.25	16.00	14.40	32.76	9.00	1.09	2.26	3.40	17.00	19.02
365TS	1155																					
364T	1122	0.625	0.625	4.250	5.88	2.375	5.64	7.00	0.69	5.88	6.13	12.25	11.25	16.00	14.40	34.89	9.00	1.09	2.26	3.40	17.00	19.02
365T	1155																					
404TS	1580	0.500	0.500	2.750	4.25	2.125	4.00	8.00	0.81	6.62	6.88	13.75	12.25	18.00	16.00	36.76	10.00	1.29	2.64	4.00	19.02	21.18
405TS	1600																					
404T	1580	0.750	0.750	5.625	7.25	2.875	7.00	8.00	0.81	6.62	6.88	13.75	12.25	18.00	16.00	39.77	10.00	1.29	2.64	4.00	19.02	21.18
405T	1600																					
444TS	2100	0.625	0.625	3.000	4.75	2.375	4.50	9.00	0.81	7.50	8.25	16.50	14.50	20.00	18.80	41.87	11.00	1.49	2.64	4.97	21.37	23.94
445TS	2260																					
444T	2100	0.875	0.875	6.875	8.50	3.375	8.25	9.00	0.81	7.50	8.25	16.50	14.50	20.00	18.80	45.62	11.00	1.49	2.64	4.97	21.37	23.94
445T	2260																					
447TS	2610	0.625	0.625	3.000	4.75	2.375	4.50	9.00	0.81	7.50	12.50	25.00	20.00	20.00	27.30	50.37	11.00	1.49	2.64	8.81	25.62	23.94
449TS	3010																					
447T	2610	0.875	0.875	6.875	8.50	3.375	8.25	9.00	0.81	7.50	12.50	25.00	20.00	20.00	27.30	54.12	11.00	1.49	2.64	8.81	25.62	23.94
449T	3010																					
449LL	3010	0.875	0.875	4.500	6.75	3.375	6.50	9.00	0.81	7.50	12.50	25.00	20.00	20.00	27.30	53.37	11.00	1.49	2.64	8.70	25.62	23.94
449TS (HO)	3200	0.625	0.625	3.000	4.75	2.375	4.50									55.63						
449T (HO)	3400	0.875	0.875	6.875	8.50	3.375	8.25	9.00	0.81	7.50	–	25.00	–	20.24	27.31	59.30	11.00	1.49	2.70	5.26	–	24.04
449LL (HO)				4.500	6.75		6.50									58.52						

Notes:

1 Shaft diameters 1 1/2 inches and smaller will come within the limits of +0.000 inch, -0.0005 inch diameters 1 5/8 inches and larger +0.000 inch, -0.001 inch

3 Tolerance on "D" dimension for rigid base motors will be +0.000 inch, -0.060 inch.

18 Motor feet have 2 holes per foot allowing NEMA F-1 or F-2 assembly while maintaining critical NEMA mounting dimensions. This does not apply to 449HO frames.

19 Providing mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward, or from either side Weights shown are approximate shipping weights and should be used for estimating only

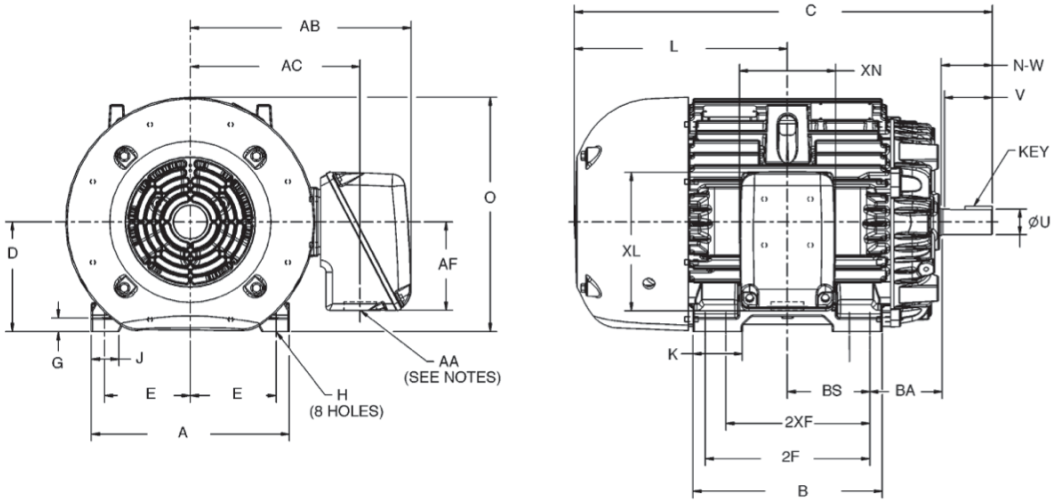
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Dimensions (cont.)

Dimensions on previous page

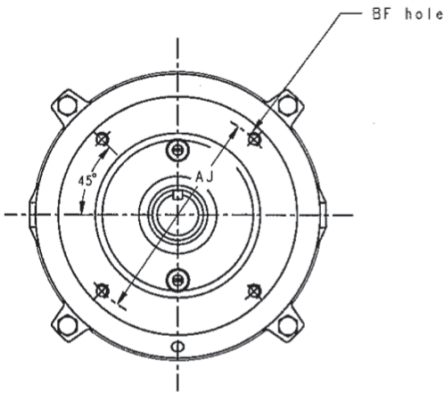
Cast Iron Construction/Frames 140-449, Type KS, 3-Phase/Dimensions—For estimating only



Conduit Box Dimensions

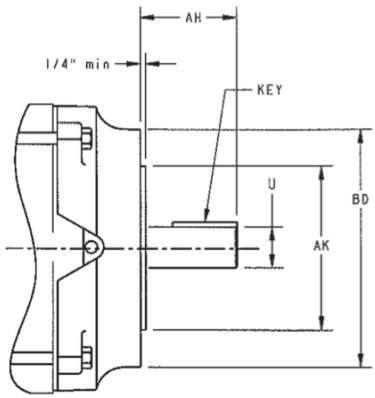
Frame	Nominal HP	Approx. Vol. (cubic in)	Dimensions in Inches					
			AA*	AB	AC	AF	XL	XN
143-145	2	32	0.75	6.62	5.12	2.50	4.30	5.40
182-184	5	32	0.75	7.82	6.32	2.50	4.30	5.40
213-215	10	55	1.00	9.50	7.42	3.50	5.78	4.16
254-256	20	140	1.25	11.68	9.12	4.59	7.37	5.37
284-286	30	140	1.50	12.44	9.88	4.59	7.37	5.37
324-326	50	346	3.00	16.13	12.43	6.44	10.14	7.00
364-365	75	346	3.00	17.07	13.37	6.44	10.14	7.00
404-405	125	700	3.00	20.48	16.22	7.00	12.13	10.50
444-449	200	700	3.00	22.00	17.74	7.00	12.13	10.50
	250-300	1260	2x 4.00	22.56	17.80	7.00	12.40	16.25

* A tapped NPT hole is provided for the conduit size listed in Column AA



C-Face Dimensions

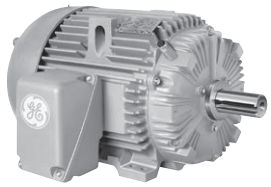
NEMA Frame	All Dimensions in Inches						
	AH	AJ	AK	U	Key Width	Key Thickness	Key Length
143TC-145TC	2.12	5.88	4.50	0.88	0.19	0.19	1.38
182TC-184TC	2.62	7.25	8.50	1.13	0.25	0.25	1.75
213TC-215TC	3.12	7.25	8.50	1.38	0.31	0.31	2.38
254TC-256TC	3.75	7.25	8.50	1.63	0.38	0.38	2.88
284TC-286TC	4.38	9.00	10.50	1.88	0.50	0.50	3.25



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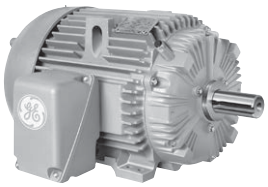
Standard Features



NEMA Frame Size	143 - 449
Poles	2, 4, 6 & 8
Horsepower Range	2-pole - 1 - 300 4-pole - 1 - 350 6-pole - .75 - 250 8-pole - .5 - 200
Voltage	460 & 575
Shaft Extension	2-pole 143-326 fr - T 284-449 fr - TS 4, 6 & 8-pole 143-449 fr - T
Agency Approvals	UL - Component and Insulation System Recognition CSA - Certification and Efficiency Verification
Industry Specifications	IEEE 841, IEEE 45 Marine Duty
Warranty (months)	60 months from date of installation or 66 months from date of manufacture, whichever occurs first
Max Ambient & Altitude	40˚C & 3300 feet
Insulation Class	H
Winding Temperature Rise	80C @1.0SF Sine wave (with some high end exceptions)
Service Factor	1.15 Sine wave (with some high end exceptions)
Bearing Housing Rise	Per IEEE 841 - 2-pole - 50C 4,6,8 pole - 45C
Division 2 Temperature Code	CSA Certified Div 2, T3 (200 C) (with some high end exceptions)
NEMA Design	B
Insulation System	Non-Hygroscopic, Anti-Fungus, Polyester Resin, Trickle Treated, Tested to Exceed NEMA MG 1 Part 31
Inverter Capability	Variable Torque INF:1
Efficiency	Per IEEE 841 (NEMA Premium 1-300 HP)
Frame Material	Cast Iron
Frame/Conduit Box Gasket	Neoprene Rubber
Frame/End Shield Seal	Yes
End Shield Material	Cast Iron
Conduit Box Material	Cast Iron or Fabricated Steel Plate
Conduit Box Cover Gasket	Neoprene Rubber
Conduit Box Rotation	90 degree increments
Conduit Box Hole Thread	NPT
Shaft Runout	Per IEEE 841
Fan Cover Material	Cast Iron
Fan	2-pole - Bi-Directional, Non-sparking Plastic (except Uni-directional Aluminum in 449 frame) 4, 6 & 8-pole - Bi-Directional, Non-sparking Plastic
Sound Power	90 dBA sound power (with some high end exceptions)
Mounting	F1 (Field modifiable to F2)
Mounting Holes	2 per foot, 8 total
Lifting	4 point cast in lugs
Bearing Type	Single Shield Ball or Open Roller
Bearing L10 Life	Belted - 26,280 hrs per NEMA MG1 14.42.2 Direct Coupled - 130,000 hrs 4 and 6 Pole, 65,000 hrs 2 Pole
Bearing Caps	Cast Iron, gasketed
Bearing Lubricant	Polyurea
Bearing Re-Lubrication	Grease fitting & plug. Extended through the fan cover. Includes provisions for conversion to Oil Mist Lubrication
Bearing Protection	Non-contact rotating labyrinth seal on both ends
Fasteners	Hex Head, Zinc Plated
Condensation Drain	Stainless Steel T-drains at the lowest point of both end shields
Balance & Vibration	ISO 1940 Grade 1 Ball bearings - .040 peak in/sec Roller bearings - 4-pole - .0006 in pk-pk 6 & 8-pole .0009 in pk-pk
Vibration Pads	Cast in vibration pads for repeatable measurements
Nameplate	316 Stainless Steel
Paint	Epoxy Ester (Buff)
Tests	NEMA Routine only

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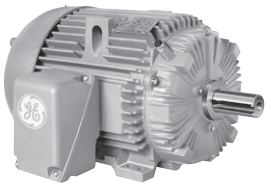


Volts: 460, 575
HP: 0.50 - 350

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
0.5	900	460	143T	**M9344**	5KS143XAA408	N	
0.5	900	575	143T	**M9345**	5KS143XAA404	N	
0.75	1200	460	143T	**M354**	5KS143XAA308	N	
0.75	1200	575	143T	**M355**	5KS143XAA304	N	
0.75	900	460	145T	**M8901**	5KS145XAA408	N	
0.75	900	575	145T	**M9346**	5KS145XAA404	N	
1	3600	460	143T	**M8903**	5KS143XAA122	N	
1	3600	575	143T	**M8904**	5KS143XAA120	N	
1	1800	460	143T	**M352**	5KS143XAA208	N	
1	1800	575	143T	**M353**	5KS143XAA204	N	
1	1200	460	145T	**M363**	5KS145XAA308	N	
1	1200	575	145T	**M364**	5KS145XAA304	N	
1	900	460	182T	**M9413**	5KS182XAA408	N	
1	900	575	182T	**M9482**	5KS182XAA404	N	
1.5	3600	460	143T	**M8905**	5KS143XAA108	N	
1.5	3600	575	143T	**M8906**	5KS143XAA104	N	
1.5	1800	460	145T	**M359**	5KS145XAA208	N	
1.5	1800	575	145T	**M360**	5KS145XAA204	N	
1.5	1200	460	182T	**M9414**	5KS182XAA308	N	
1.5	1200	575	182T	**M9483**	5KS182XAA304	N	
1.5	900	460	184T	**M9415**	5KS184XAA408	N	
1.5	900	575	184T	**M9485**	5KS184XAA404	N	
2	3600	460	145T	**M8907**	5KS145XAA108	N	
2	3600	575	145T	**M8908**	5KS145XAA104	N	
2	1800	460	145T	**M361**	5KS145XAA220	N	
2	1800	575	145T	**M362**	5KS145XAA223	N	
2	1200	460	184T	**M9416**	5KS184XAA308	N	
2	1200	575	184T	**M9486**	5KS184XAA304	N	
2	900	460	213T	**M9417**	5KS213XAA408	N	
2	900	575	213T	**M9487**	5KS213XAA404	N	
3	3600	460	182T	**M9418**	5KS182XAA108	Y	
3	3600	575	182T	**M9488**	5KS182XAA104	N	
3	1800	460	182T	**M9419**	5KS182XAA208	Y	
3	1800	575	182T	**M9489**	5KS182XAA204	N	
3	1200	460	213T	**M9420**	5KS213XAA308	Y	
3	1200	575	213T	**M9490**	5KS213XAA304	N	
3	900	460	215T	**M9421**	5KS215XAA408	N	
3	900	575	215T	**M9491**	5KS215XAA404	N	
5	3600	460	184T	**M9422**	5KS184XAA108	Y	
5	3600	575	184T	**M9492**	5KS184XAA104	N	
5	1800	460	184T	**M9423**	5KS184XAA208	Y	
5	1800	575	184T	**M9493**	5KS184XAA204	Y	

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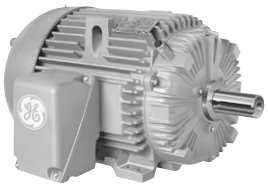


Volts: 460, 575
HP: 0.50 - 350

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
5	1200	460	215T	**M9424**	5KS215XAA308	Y	
5	1200	575	215T	**M9494**	5KS215XAA304	N	
5	900	460	254T	**M9425**	5KS254XAA408	N	
5	900	575	254T	**M9495**	5KS254XAA404	N	
7.5	3600	460	213T	**M9426**	5KS213XAA108	Y	
7.5	3600	575	213T	**M9496**	5KS213XAA104	N	
7.5	1800	460	213T	**M9427**	5KS213XAA208	Y	
7.5	1800	575	213T	**M9497**	5KS213XAA204	N	
7.5	1200	460	254T	**M9428**	5KS254XAA308	Y	
7.5	1200	575	254T	**M9498**	5KS254XAA304	N	
7.5	900	460	256T	**M9429**	5KS256XAA408	N	
7.5	900	575	256T	**M9499**	5KS256XAA404	N	
10	3600	460	215T	**M9430**	5KS215XAA108	Y	
10	3600	575	215T	**M9563**	5KS215XAA104	N	
10	1800	460	215T	**M9431**	5KS215XAA208	Y	
10	1800	575	215T	**M9564**	5KS215XAA204	Y	
10	1200	460	256T	**M9432**	5KS256XAA308	Y	
10	1200	575	256T	**M9565**	5KS256XAA304	N	
10	900	460	284TS	**M9018**	5KS284XAA418	N	
10	900	460	284T	**M9433**	5KS284XAA408	N	
10	900	575	284T	**M9566**	5KS284XAA404	N	
15	3600	460	254T	**M9434**	5KS254XAA108	Y	
15	3600	575	254T	**M9567**	5KS254XAA104	N	
15	1800	460	254T	**M9435**	5KS254XAA208	Y	
15	1800	575	254T	**M9568**	5KS254XAA204	N	
15	1200	460	284TS	**M9019**	5KS284XAA318	N	
15	1200	460	284T	**M9436**	5KS284XAA308	Y	
15	1200	575	284T	**M9569**	5KS284XAA304	N	
15	900	460	286TS	**M9020**	5KS286XAA418	N	
15	900	460	286T	**M9437**	5KS286XAA408	N	
15	900	575	286T	**M9570**	5KS286XAA404	N	
20	3600	460	256T	**M9438**	5KS256XAA108	Y	
20	3600	575	256T	**M9571**	5KS256XAA104	N	
20	1800	460	256T	**M9439**	5KS256XAA208	Y	
20	1800	575	256T	**M9572**	5KS256XAA204	N	
20	1200	460	286TS	**M9021**	5KS286XAA318	N	
20	1200	460	286T	**M9440**	5KS286XAA308	Y	
20	1200	575	286T	**M9573**	5KS286XAA304	N	
20	900	460	324TS	**M9022**	5KS324XAA418	N	
20	900	460	324T	**M9441**	5KS324XAA408	Y	
20	900	575	324T	**M9574**	5KS324XAA404	N	

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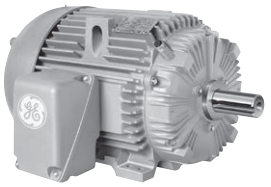


Volts: 460, 575
HP: 0.50 - 350

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
25	3600	460	284TS	**M9442**	5KS284XAA118	Y	
25	3600	460	284T	**M9347**	5KS284XAA108	N	
25	3600	575	284TS	**M9575**	5KS284XAA114	N	
25	3600	575	284T	**M9348**	5KS284XAA104	N	
25	1800	460	284TS	**M9383**	5KS284XAA218	Y	
25	1800	460	284T	**M9443**	5KS284XAA208	Y	
25	1800	575	284T	**M9576**	5KS284XAA204	Y	
25	1200	460	324TS	**M9023**	5KS324XAA318	N	
25	1200	460	324T	**M9444**	5KS324XAA308	Y	
25	1200	575	324T	**M9577**	5KS324XAA304	N	
25	900	460	326TS	**M9024**	5KS326XAA418	N	
25	900	460	326T	**M9445**	5KS326XAA408	N	
25	900	575	326T	**M9578**	5KS326XAA404	Y	
30	3600	460	286TS	**M9446**	5KS286XAA118	Y	
30	3600	460	286T	**M9349**	5KS286XAA108	N	
30	3600	575	286TS	**M9579**	5KS286XAA114	N	
30	3600	575	286T	**M9350**	5KS286XAA104	N	
30	1800	460	286TS	**M9388**	5KS286XAA218	N	
30	1800	460	286T	**M9447**	5KS286XAA208	Y	
30	1800	575	286T	**M9580**	5KS286XAA204	Y	
30	1200	460	326TS	**M9025**	5KS326XAA318	N	
30	1200	460	326T	**M9448**	5KS326XAA308	Y	
30	1200	575	326T	**M9581**	5KS326XAA304	N	
30	900	460	364TS	**M9026**	5KS364XAA418	N	
30	900	460	364T	**M9449**	5KS364XAA408	N	
30	900	575	364T	**M9582**	5KS364XAA404	N	
40	3600	460	324TS	**M9450**	5KS324XAA118	Y	
40	3600	460	324T	**M9351**	5KS324XAA108	N	
40	3600	575	324TS	**M9583**	5KS324XAA114	N	
40	3600	575	324T	**M9352**	5KS324XAA104	N	
40	1800	460	324TS	**M9389**	5KS324XAA218	N	
40	1800	460	324T	**M9451**	5KS324XAA208	Y	
40	1800	575	324T	**M9584**	5KS324XAA204	Y	
40	1200	460	364TS	**M9027**	5KS364XAA318	N	
40	1200	460	364T	**M9452**	5KS364XAA308	Y	
40	1200	575	364T	**M9585**	5KS364XAA304	N	
40	900	460	365TS	**M9028**	5KS365XAA418	N	
40	900	460	365T	**M9453**	5KS365XAA408	N	
40	900	575	365T	**M9586**	5KS365XAA404	N	
50	3600	460	326TS	**M9454**	5KS326XAA118	Y	
50	3600	460	326T	**M9353**	5KS326XAA108	N	
50	3600	575	326TS	**M9587**	5KS326XAA114	N	
50	3600	575	326T	**M9354**	5KS326XAA104	N	

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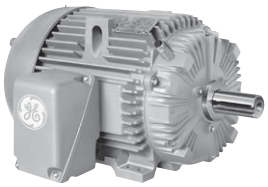
Volts: 460, 575
HP: 0.50 - 350

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
50	1800	460	326TS	**M9390**	5KS326XAA218	N	
50	1800	460	326T	**M9455**	5KS326XAA208	Y	
50	1800	575	326T	**M9588**	5KS326XAA204	N	
50	1200	460	365TS	**M9029**	5KS365XAA318	N	
50	1200	460	365T	**M9456**	5KS365XAA308	Y	
50	1200	575	365T	**M9589**	5KS365XAA304	N	
50	900	460	404TS	**M9030**	5KS404XAA418	N	
50	900	460	404T	**M9457**	5KS404XAA408	N	
50	900	575	404T	**M9590**	5KS404XAA404	N	
60	3600	460	364TS	**M9458**	5KS364XAA118	Y	
60	3600	460	364T	**M9602**	5KS364XAA108	N	
60	3600	575	364TS	**M9591**	5KS364XAA114	N	
60	1800	460	364TS	**M9391**	5KS364XAA218	N	
60	1800	460	364T	**M9459**	5KS364XAA208	Y	
60	1800	575	364T	**M9592**	5KS364XAA204	Y	
60	1200	460	404TS	**M9031**	5KS404XAA318	N	
60	1200	460	404T	**M9460**	5KS404XAA308	Y	
60	1200	575	404T	**M9593**	5KS404XAA304	N	
60	1200	575	404T	**M9480**	5KS404XAA370	N	98
60	900	460	405TS	**M9032**	5KS405XAA418	N	
60	900	460	405T	**M9461**	5KS405XAA408	N	
60	900	575	405T	**M9594**	5KS405XAA404	N	
75	3600	460	365TS	**M9462**	5KS365XAA118	Y	
75	3600	575	365TS	**M8917**	5KS365XAA114	N	
75	1800	460	365TS	**M9392**	5KS365XAA218	N	
75	1800	460	365T	**M9463**	5KS365XAA208	Y	
75	1800	460	365T	**M9601**	5KS365XAA2158	N	98
75	1800	575	365T	**M9596**	5KS365XAA204	N	
75	1800	575	365T	**M9071**	5KS365XAA2143	N	98
75	1200	460	405TS	**M9033**	5KS405XAA318	N	
75	1200	460	405T	**M9464**	5KS405XAA308	Y	
75	1200	460	405T	**M9355**	5KS405XAA370	N	98
75	1200	575	405T	**M9597**	5KS405XAA304	N	
75	1200	575	405T	**M9481**	5KS405XAA379	N	98
75	900	460	444TS	**M9034**	5KS444XAA418	N	
75	900	460	444T	**M9465**	5KS444XAA408	Y	
75	900	575	444T	**M9598**	5KS444XAA404	N	
100	3600	460	405TS	**M9466**	5KS405XAA118	Y	112
100	3600	575	405TS	**M8918**	5KS405XAA114	N	112

Notes:
98 For belted load only. Roller bearing on drive-end.
112 Sound level exceeds IEEE 841

XSD Ultra 841

TEFC—Extra Severe Duty



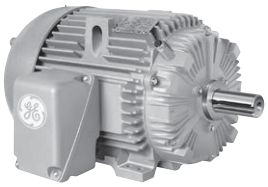
Volts: 460, 575
HP: 0.50 - 350

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
100	1800	460	405TS	**M9393**	5KS405XAA218	N	
100	1800	460	405T	**M9467**	5KS405XAA208	Y	
100	1800	460	405T	**M9356**	5KS405XAA2088	Y	98
100	1800	575	405T	**M9693**	5KS405XAA204	N	
100	1800	575	405T	**M9484**	5KS405XAA2122	N	98
100	1200	460	444TS	**M9035**	5KS444XAA318	N	
100	1200	460	444T	**M9468**	5KS444XAA308	Y	
100	1200	460	444T	**M9357**	5KS444XAA366	Y	98
100	1200	575	444T	**M9694**	5KS444XAA304	N	
100	1200	575	444T	**M9533**	5KS444XAA373	N	98
100	900	460	445TS	**M9036**	5KS445XAA418	N	
100	900	460	445T	**M9469**	5KS445XAA408	N	
100	900	575	445T	**M9695**	5KS445XAA404	N	
125	3600	460	444TS	**M9470**	5KS444XAA118	Y	
125	3600	575	444TS	**M8919**	5KS444XAA114	N	
125	1800	460	444TS	**M9615**	5KS444XAA218	N	
125	1800	460	444T	**M9471**	5KS444XAA208	Y	
125	1800	460	444T	**M9358**	5KS444XAA2028	Y	98
125	1800	575	444T	**M9697**	5KS444XAA204	N	
125	1800	575	444T	**M9539**	5KS444XAA2058	N	98
125	1200	460	445TS	**M9037**	5KS445XAA318	N	
125	1200	460	445T	**M9472**	5KS445XAA308	Y	
125	1200	460	445T	**M9359**	5KS445XAA371	Y	98
125	1200	575	445T	**M9698**	5KS445XAA304	N	
125	1200	575	445T	**M9595**	5KS445XAA380	N	98
125	900	460	447TS	**M9038**	5KS447XAA418	N	
125	900	460	447T	**M9473**	5KS447XAA408	N	
125	900	575	447T	**M9699**	5KS447XAA404	N	
150	3600	460	445TS	**M9474**	5KS445XAA118	Y	
150	3600	575	445TS	**M8920**	5KS445XAA114	N	
150	1800	460	445TS	**M9616**	5KS445XAA218	N	
150	1800	460	445T	**M9475**	5KS445XAA208	Y	
150	1800	460	445T	**M9360**	5KS445XAA2054	Y	98
150	1800	575	445T	**M9384**	5KS445XAA204	N	
150	1800	575	445T	**M9599**	5KS445XAA2083	N	98
150	1200	460	447TS	**M9039**	5KS447XAA318	N	
150	1200	460	447T	**M9476**	5KS447XAA308	Y	
150	1200	460	447T	**M9361**	5KS447XAA363	Y	98
150	1200	575	447T	**M9385**	5KS447XAA304	N	
150	1200	575	447T	**M9386**	5KS447XAA374	N	98

Notes:
98 For belted load only. Roller bearing on drive-end.

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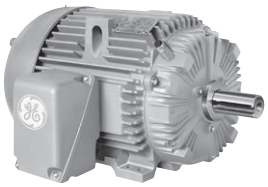
Volts: 460, 575
HP: 0.50 - 350

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
150	900	460	449TS	**M9040**	5KS449XAA418	N	
150	900	460	449T	**M8937**	5KS449XAA408	N	
150	900	575	449T	**M8938**	5KS449XAA404	N	
200	3600	460	447TS	**M9477**	5KS447XAA118	Y	112
200	3600	575	447TS	**M8939**	5KS447XAA114	N	112
200	1800	460	445T	**M9042**	5KS445XAA209	N	
200	1800	460	447T	**M9478**	5KS447XAA208	Y	
200	1800	460	447T	**M9362**	5KS447XAA2044	Y	98
200	1800	460	447TS	**M9110**	5KS447XAA218	N	
200	1800	575	447T	**M9387**	5KS447XAA204	N	
200	1800	575	447T	**M9363**	5KS447XAA2045	N	98
200	1200	460	449TS	**M9041**	5KS449XAA318	N	
200	1200	460	449T	**M8940**	5KS449XAA308	Y	
200	1200	460	449T	**M9364**	5KS449XAA350	Y	98
200	1200	575	449T	**M8941**	5KS449XAA304	N	
200	1200	575	449T	**M9365**	5KS449XAA351	N	98
200	900	460	449T	**M8942**	5KS449XAA409	N	
200	900	575	449T	**M9366**	5KS449XAA439	N	
250	3600	460	449TS	**M8943**	5KS449XAA123	Y	66, 112
250	3600	460	449TS	**M8979**	5KS449XAA125	Y	62, 112
250	3600	575	449TS	**M8944**	5KS449XAA124	N	66, 112
250	3600	575	449TS	**M9367**	5KS449XAA143	N	62, 112
250	1800	460	449T	**M8945**	5KS449XAA224	Y	
250	1800	460	449T	**M9368**	5KS449XAA287	Y	98
250	1800	575	449T	**M8946**	5KS449XAA225	N	
250	1800	575	449T	**M9369**	5KS449XAA288	N	98
250	1200	460	449T	**M8947**	5KS449XAA337	Y	
250	1200	460	449T	**M9370**	5KS449XAA352	Y	98
250	1200	575	449T	**M9630**	5KS449XAA345	N	
250	1200	575	449T	**M9371**	5KS449XAA353	N	98
300	3600	460	449TS	**M8948**	5KS449XAA134	N	62, 112
300	3600	460	449TS	**M9372**	5KS449XAA144	N	66, 112
300	3600	575	449TS	**M9373**	5KS449XAA145	N	62, 112
300	3600	575	449TS	**M9374**	5KS449XAA146	N	66, 112
300	1800	460	449T	**M8949**	5KS449XAA208	Y	112
300	1800	460	449T	**M9375**	5KS449XAA289	N	98, 112
300	1800	575	449T	**M9640**	5KS449XAA275	N	112
300	1800	575	449T	**M9376**	5KS449XAA290	N	98, 112
300	1200	460	449T	**M9997**	5KS449XAH308	N	175
350	1800	460	449T	**M9998**	5KS449XAA2038	N	112, 149

Notes:
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
98 For belted load only. Roller bearing on drive-end.
112 Noise level exceeds IEEE-841
149 Class F rise @ 1.0 SF only
175 Special long “high output frame”. Contact dealer for outline drawing. This frame is not suitable for F1 to F2 conversion.

XSD Ultra 841

TEFC—Extra Severe Duty
C-Face



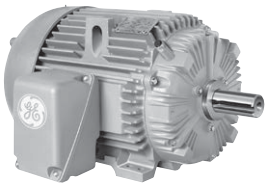
Volts: 460, 575
HP: 1 - 250

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
1	3600	460	143TC	**M9377**	5KS143XAA139	N	
1	1800	460	143TC	**M520**	5KS143XAA200	N	
1	1800	460	143TCZ	**M9140**	5KS143XAA295	N	158
1	1800	575	143TC	**M9540**	5KS143XAA2024	N	
1.5	3600	460	143TC	**M9378**	5KS143XAA140	N	
1.5	1800	460	145TC	**M521**	5KS145XAA200	N	
1.5	1800	575	145TC	**M9541**	5KS145XAA2028	N	
1.5	1200	460	182TC	**M8926**	5KS182XAA300	N	
2	3600	460	145TC	**M9379**	5KS145XAA143	N	158
2	1800	460	145TC	**M526**	5KS145XAA222	N	
2	1800	460	145TCZ	**M495**	5KS145XAA295	N	
2	1800	575	145TC	**M9542**	5KS145XAA2029	N	
2	1200	460	184TC	**M8928**	5KS184XAA300	N	
3	3600	460	182TC	**M8925**	5KS182XAA100	Y	
3	3600	575	182TC	**M9543**	5KS182XAA144	N	
3	1800	460	182TC	**M8909**	5KS182XAA200	Y	
3	1800	575	182TC	**M9544**	5KS182XAA2026	Y	
3	1200	460	213TC	**M9380**	5KS213XAA329	N	
5	3600	460	184TC	**M8927**	5KS184XAA100	Y	
5	3600	575	184TC	**M9545**	5KS184XAA1044	N	
5	1800	460	184TC	**M8910**	5KS184XAA200	Y	
5	1800	575	184TC	**M9546**	5KS184XAA2067	Y	
5	1200	460	215TC	**M8932**	5KS215XAA300	Y	
7.5	3600	460	213TC	**M8929**	5KS213XAA100	Y	
7.5	3600	575	213TC	**M9547**	5KS213XAA1044	N	
7.5	1800	460	213TC	**M8911**	5KS213XAA200	Y	
7.5	1800	575	213TC	**M9548**	5KS213XAA2074	N	
7.5	1200	460	254TC	**M8934**	5KS254XAA300	N	
10	3600	460	215TC	**M8931**	5KS215XAA100	Y	
10	3600	575	215TC	**M9549**	5KS215XAA1040	N	
10	1800	460	215TC	**M8912**	5KS215XAA200	Y	
10	1800	575	215TC	**M9550**	5KS215XAA2070	N	
10	1200	460	256TC	**M8936**	5KS256XAA300	N	
15	3600	460	254TC	**M8933**	5KS254XAA100	Y	
15	3600	575	254TC	**M9551**	5KS254XAA1076	N	
15	1800	460	254TC	**M8913**	5KS254XAA200	Y	
15	1800	575	254TC	**M9552**	5KS254XAA2102	N	
15	1200	460	284TC	**M8921**	5KS284XAA300	N	

Notes:
158 56C C-Face and Shaft Extension
C-Face ratings through 250HP, 449T Frame are available by custom order

XSD Ultra 841

TEFC—Extra Severe Duty
C-Face



Volts: 460, 575
HP: 1 - 250

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
20	3600	460	256TC	**M8935**	5KS256XAA100	Y	
20	3600	575	256TC	**M9553**	5KS256XAA1014	N	
20	1800	460	256TC	**M8914**	5KS256XAA200	Y	
20	1800	575	256TC	**M9554**	5KS256XAA2068	N	
20	1200	460	286TC	**M8922**	5KS286XAA300	N	
25	3600	460	284TC	**M8923**	5KS284XAA100	N	
25	3600	460	284TSC	**M8951**	5KS284XAA139	Y	
25	3600	575	284TSC	**M9555**	5KS284XAA1007	N	
25	1800	460	284TC	**M8915**	5KS284XAA200	Y	
25	1800	575	284TC	**M9556**	5KS284XAA2036	N	
25	1200	460	324TC	**M9381**	5KS324XAA353	N	
30	3600	460	286TC	**M8924**	5KS286XAA100	N	
30	3600	460	286TSC	**M8952**	5KS286XAA128	N	
30	3600	575	286TSC	**M9557**	5KS286XAA181	N	
30	1800	460	286TC	**M8916**	5KS286XAA200	Y	
30	1800	575	286TC	**M9558**	5KS286XAA2027	Y	
30	1200	460	326TC	**M9382**	5KS326XAA340	N	
40	3600	460	324TSC	**M8971**	5KS324XAA175	N	
40	3600	575	324TSC	**M9559**	5KS324XAA1106	N	
40	1800	460	324TC	**M8972**	5KS324XAA279	Y	
40	1800	575	324TC	**M9560**	5KS324XAA2146	N	
50	3600	460	326TSC	**M8973**	5KS326XAA155	N	
50	3600	575	326TSC	**M9561**	5KS326XAA1035	N	
50	1800	460	326TC	**M8974**	5KS326XAA263	Y	
50	1800	575	326TC	**M9562**	5KS326XAA2083	N	
60	3600	460	364TSC	**M9000**	5KS364XAA100	N	
60	1800	460	364TC	**M9007**	5KS364XAA200	Y	
75	3600	460	365TSC	**M9001**	5KS365XAA100	N	
75	1800	460	365TC	**M9008**	5KS365XAA200	N	
100	3600	460	405TSC	**M9002**	5KS405XAA100	N	
100	1800	460	405TC	**M9009**	5KS405XAA200	N	
125	3600	460	444TSC	**M9003**	5KS444XAA100	N	
125	1800	460	444TC	**M9010**	5KS444XAA200	N	
150	3600	460	445TSC	**M9004**	5KS445XAA100	N	
150	1800	460	445TC	**M9011**	5KS445XAA200	N	
200	3600	460	447TSC	**M9005**	5KS447XAA100	N	
200	1800	460	447TC	**M9012**	5KS447XAA200	N	
250	3600	460	449TSC	**M9006**	5KS449XAA100	N	
250	1800	460	449TC	**M9013**	5KS449XAA200	N	

XSD Ultra 841 Vertical C-Face NT

TEFC—Extra Severe Duty (IP56)

Standard Features



NEMA Frame Size	143 - 365
Poles	2, 4 & 6
Horsepower Range	2-pole - 1 - 75 4-pole - 1 - 75 6-pole - 1.5 - 50
Voltage	460, 2300/4000
Shaft Extension	2-pole 143-286 fr - T 284-365 fr - TS 4 & 6-pole 4P: 143-365, 6P: 182-326 - T
Agency Approvals	UL - Component and Insulation System Recognition CSA - Certification and Efficiency Verification
Industry Specifications	IEEE 841, IEEE 45 Marine Duty
Warranty (months)	60 months from date of installation or 66 months from date of manufacture, whichever occurs first
Max Ambient & Altitude	40˚C & 3300 feet
Insulation Class	H
Winding Temperature Rise	80C @1.0SF Sine wave (with some high end exceptions)
Service Factor	1.15 Sine wave (with some high end exceptions)
Bearing Housing Rise	Per IEEE 841 - 2-pole - 50C 4 & 6-pole - 45C
Division 2 Temperature Code	CSA Certified Div 2, T3 (200 C) (with some high end exceptions)
NEMA Design	B
Insulation System	Non-Hygroscopic, Anti-Fungus, Polyester Resin, Trickle Treated, Tested to Exceed NEMA MG 1 Part 31
Inverter Capability	Variable Torque INF:1
Efficiency	Per IEEE 841 (NEMA Premium 1-300 HP)
Frame Material	Cast Iron
Frame/Conduit Box Gasket	Neoprene Rubber
Frame/End Shield Seal	Yes
End Shield Material	Cast Iron
Conduit Box Material	Cast Iron or Fabricated Steel Plate
Conduit Box Cover Gasket	Neoprene Rubber
Conduit Box Rotation	90 degree increments
Conduit Box Hole Thread	NPT
Shaft Runout	Per IEEE 841
Fan Cover Material	Cast iron
Fan	2-pole - Bi-Directional, Non-sparking Plastic (except Uni-directional Aluminum in 449 frame) 4 & 6-pole - Bi-Directional, Non-sparking Plastic
Sound Power	90 dBA sound power (with some high end exceptions)
Mounting	W6, Shaft Down with C-Face Flange
Mounting Holes	Per NEMA
Lifting	4 point cast in lugs
Bearing Type	Single Shield Ball
Bearing L10 Life	Direct Coupled - 50,000 hrs per IEEE 841
Bearing Caps	Cast Iron, gasketed
Bearing Lubricant	Polyurea
Bearing Re-Lubrication	Grease fitting & plug. Extended through the fan cover. Includes provisions for conversion to Oil Mist Lubrication
Bearing Protection	Non-contact rotating labyrinth seal on both ends
Fasteners	Hex Head, Zinc Plated
Condensation Drain	Stainless Steel T-drains at the lowest point of both end shields
Balance & Vibration	ISO 1940 Grade 1 Ball bearings - .040 peak in/sec
Vibration Pads	Cast in vibration pads for repeatable measurements
Nameplate	316 Stainless Steel
Paint	Epoxy ester, RAL 1001
Tests	NEMA Routine only

XSD Ultra 841 Vertical C-Face NT

TEFC—Extra Severe Duty (IP56)



Volts: 460, 2300/4000
HP: 1 - 150

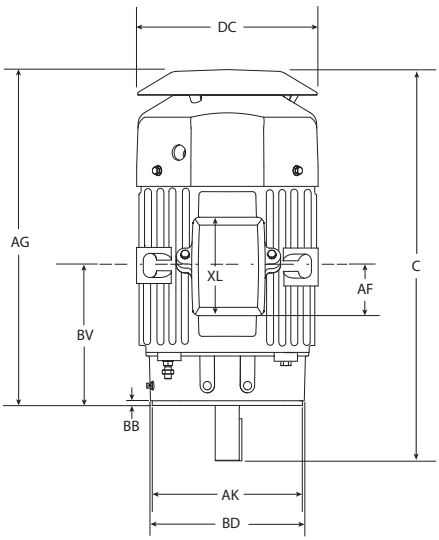
HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	L10 Down Thrust (lbs) @ 8,760 Hrs	L10 Down Thrust (lbs) @ 50,000 Hrs	Notes
1	3600	460	143TC	**M9400**	5KS143XAA145	N	260	120	
1	1800	460	143TC	**M9401**	5KS143XAA2008	N	332	146	
1.5	3600	460	143TC	**M9402**	5KS143XAA146	N	253	115	
1.5	1800	460	145TC	**M9403**	5KS145XAA2009	N	321	137	
1.5	1200	460	182TC	**M9404**	5KS182XAA326	N	690	308	
2	3600	460	145TC	**M9405**	5KS145XAA145	N	249	110	
2	1800	460	145TC	**M9406**	5KS145XAA2010	N	316	132	
2	1200	460	184TC	**M9407**	5KS184XAA325	N	677	295	
3	3600	460	182TC	**M9408**	5KS182XAA138	N	448	205	
3	1800	460	182TC	**M9409**	5KS182XAA2004	N	575	254	
3	1200	460	213TC	**M9410**	5KS213XAA335	N	1089	495	
5	3600	460	184TC	**M9411**	5KS184XAA1022	N	438	196	
5	1800	460	184TC	**M9412**	5KS184XAA2031	N	555	235	
5	1200	460	215TC	**M9500**	5KS215XAA341	N	1056	467	
7.5	3600	460	213TC	**M9501**	5KS213XAA1023	N	698	320	
7.5	1800	460	213TC	**M9502**	5KS213XAA2049	N	903	400	
7.5	1200	460	254TC	**M9503**	5KS254XAA335	N	1293	591	
10	3600	460	215TC	**M9504**	5KS215XAA1018	N	691	313	
10	1800	460	215TC	**M9505**	5KS215XAA2043	N	887	385	
10	1200	460	256TC	**M9506**	5KS256XAA327	N	1284	583	
15	3600	460	254TC	**M9507**	5KS254XAA1044	N	793	353	
15	1800	460	254TC	**M9508**	5KS254XAA2059	N	999	419	
15	1200	460	284TC	**M9509**	5KS284XAA338	N	1231	533	
20	3600	460	256TC	**M9513**	5KS256XAA198	N	761	321	
20	1800	460	256TC	**M9515**	5KS256XAA2041	N	999	412	
20	1200	460	286TC	**M9516**	5KS286XAA332	N	1189	490	
25	3600	460	284TC	**M9517**	5KS284XAA186	N	749	312	
25	3600	460	284TSC	**M9518**	5KS284XAA187	N	749	312	
25	1800	460	284TC	**M9519**	5KS284XAA2002	N	970	387	
25	1200	460	324TC	**M9520**	5KS324XAA354	N	1540	634	
30	3600	460	286TC	**M9521**	5KS286XAA167	N	712	275	
30	3600	460	286TSC	**M9522**	5KS286XAA168	N	712	275	
30	1800	460	286TC	**M9523**	5KS286XAA2010	N	944	362	
30	1200	460	326TC	**M9524**	5KS326XAA342	N	1540	634	
40	3600	460	324TSC	**M9525**	5KS324XAA1079	N	334	96	
40	1800	460	324TC	**M9526**	5KS324XAA2109	N	1295	539	
50	3600	460	326TSC	**M9527**	5KS326XAA1009	N	321	83	
50	1800	460	326TC	**M9528**	5KS326XAA2055	N	1247	492	
60	3600	460	364TSC	**M9529**	5KS364XAA187	N	543	172	
60	1800	460	364TC	**M9530**	5KS364XAA2034	N	1675	690	
75	3600	460	365TSC	**M9531**	5KS365XAA1002	N	523	154	
75	1800	460	365TC	**M9532**	5KS365XAA2034	N	1604	620	
100	1800	460	405TC	**M9016**	5KS405XAA2257	N	–	–	
100	1800	460	405TSC	**M9017**	5KS405XAA2132	N	–	–	
150	1800	460	445TC	**M9014**	5KS445XAA2175	N	–	–	
150	1800	2300/4000	449TC	**M9015**	5KS449XAA2119W6	N	–	–	

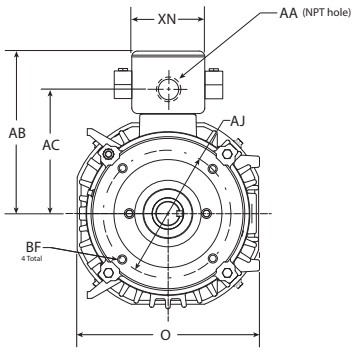
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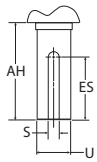
TEFC—Extra Severe Duty (IP56)



Dimensions







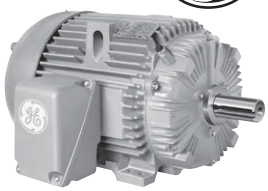
Frame	Approx. Net Weight in lbs	Dimensions in inches																	
		Shaft							Mounting										
		Key																	
		Width	Depth	Length	AH	ES	S	U	AF	AG	AK	AJ	BB (Min)	BF	BD	BV	C	DC	O
143TC	43	0.187	0.187	1.38	1.90	1.41	0.187	0.875	2.50	13.34	8.5	7.25	0.16	3/8-16 UNC	6.5	11.93	15.77	8	7.25
145TC	50	0.187	0.187	1.38	1.90	1.41	0.187	0.875	2.50	13.34	8.5	7.25	0.16	3/8-16 UNC	6.5	11.93	15.77	8	7.25
182TC	76	0.25	0.25	1.75	2.40	1.78	0.25	1.125	3.50	15.31	8.5	7.25	0.25	1/2-13 UNC	8.5	15.58	17.93	8.76	9.21
184TC	101	0.25	0.25	1.75	2.40	1.78	0.25	1.125	3.50	15.31	8.5	7.25	0.25	1/2-13 UNC	8.5	15.58	17.93	8.76	9.21
213TC	200	0.312	0.312	2.38	3.31	2.41	0.312	1.375	3.50	19	8.5	7.25	0.25	1/2-13 UNC	8.7	19.27	22.13	10.24	10.31
215TC	220	0.312	0.312	2.38	3.31	2.41	0.312	1.375	3.50	19	8.5	7.25	0.25	1/2-13 UNC	8.7	19.27	22.13	10.24	10.31
254TC	315	0.375	0.375	2.88	3.61	2.91	0.375	1.625	4.59	23.82	8.5	7.25	0.25	1/2-13 UNC	8.7	24.09	27.57	12.24	12.38
256TC	350	0.375	0.375	2.88	3.61	2.91	0.375	1.625	4.59	23.82	8.5	7.25	0.25	1/2-13 UNC	8.7	24.09	27.57	12.24	12.38
284TC	460	0.5	0.5	3.25	4.10	3.28	0.5	1.875	4.59	25.66	10.5	9	0.25	1/2-13 UNC	10.77	25.66	30.04	13.5	13.76
286TC	510	0.5	0.5	3.25	4.10	3.28	0.5	1.875	4.59	25.66	10.5	9	0.25	1/2-13 UNC	10.77	25.66	30.04	13.5	13.76
284TSC	460	0.375	0.375	1.88	3.00	1.91	0.375	1.625	4.59	25.66	10.5	9	0.25	1/2-13 UNC	10.77	25.93	28.66	13.5	13.76
286TSC	510	0.375	0.375	1.88	3.00	1.91	0.375	1.625	4.59	25.66	10.5	9	0.25	1/2-13 UNC	10.77	25.93	28.66	13.5	13.76
324TC	664	0.5	0.5	3.88	5.00	3.91	0.5	2.125	6.44	28	10.5	11	0.25	5/8-11 UNC	12.86	28.25	33	14.7	17
326TC	800	0.5	0.5	3.88	5.00	3.91	0.5	2.125	6.44	28	10.5	11	0.25	5/8-11 UNC	12.86	28.25	33	14.7	17
324TSC	664	0.5	0.5	2	3.50	2.03	0.5	1.875	6.44	28	12.5	11	0.25	5/8-11 UNC	12.86	28.25	31.5	14.7	16.68
326TSC	800	0.5	0.5	2	3.50	2.03	0.5	1.875	6.44	28	12.5	11	0.25	5/8-11 UNC	12.86	28.25	31.5	14.7	16.68
364TC	1122	0.625	0.5	4.25	5.62	4.28	0.625	2.375	6.44	32.45	12.5	11	0.25	5/8-11 UNC	13.02	32.7	38.06	19.02	18.86
365TC	1155	0.625	0.5	4.25	5.62	4.28	0.625	2.375	6.44	32.45	12.5	11	0.25	5/8-11 UNC	13.02	32.7	38.06	19.02	18.86
364TSC	1122	0.5	0.5	2	3.47	2.03	0.5	1.875	6.44	32.45	12.5	11	0.25	5/8-11 UNC	13.02	32.7	35.93	19.02	18.86
365TSC	1155	0.5	0.5	2	3.47	2.03	0.5	1.875	6.44	32.45	12.5	11	0.25	5/8-11 UNC	13.02	32.7	35.93	19.02	18.86

Frame	Nominal HP	Approx. Volume	AA (NPT Thread)	AB	AC	AF	XL	XN
143-145	2	32	3/4 "	6.63	5.12	2.5	4.3	5.4
182-184	5	55	1"	8.7	6.62	3.5	5.78	4.16
213-215	10	55	1"	9.5	7.42	3.5	5.78	4.16
254-256	20	140	1-1/4 "	12.15	9.12	4.59	7.37	5.37
284-286	30	140	1-1/2 "	12.91	9.88	4.59	7.37	5.37
324-326	50	346	3 "	16.13	12.43	6.44	10.15	7
364-365	75	346	3 "	17.14	13.43	6.44	10.09	7

XSD Ultra 841

TEFC—Extra Severe Duty

Dimensions



Dimensions refer to drawing on following page

Cast Iron Construction/Frames 140-449, Type KS, 3-Phase/Dimensions—For estimating only

Frame [19]	Approx. Net Weight (lbs)	Dimensions in Inches																				
		Shaft						Mounting [18]														
		Keyway		Key Length	N-W	U [1]	V	E	H	BA	BS	2F	2XF	A	B	C	D [3]	G	J	K	L	O
		Width	Depth																			
143T	43	0.187	0.187	1.380	2.25	0.875	2.12	2.75	0.39	2.25	2.25	5.00	4.00	6.88	5.88	13.42	3.50	0.40	1.39	2.32	6.42	7.25
145T	50																					
182T	76	0.250	0.250	1.750	2.75	1.125	2.50	3.75	0.46	2.75	2.75	5.50	4.50	8.68	6.64	15.91	4.50	0.46	1.54	2.58	7.66	9.25
184T	101																					
213T	200	0.312	0.312	2.380	3.38	1.375	3.12	4.25	0.46	3.50	3.50	7.00	5.50	9.60	8.00	20.15	5.25	0.57	1.47	3.12	9.77	10.43
215T	220																					
254T	315	0.375	0.375	2.880	4.00	1.625	3.76	5.00	0.58	4.25	5.00	10.00	8.25	11.20	11.30	25.29	6.25	0.65	1.52	3.93	12.34	12.50
256T	350																					
284TS	460	0.375	0.375	1.880	3.25	1.625	3.00	5.50	0.58	4.76	5.50	11.00	9.50	12.40	12.80	27.20	7.00	0.76	1.75	4.12	13.70	13.88
286TS	510																					
284T	460	0.500	0.500	3.250	4.62	1.875	4.38	5.50	0.58	4.76	5.50	11.00	9.50	12.40	12.80	28.58	7.00	0.76	1.75	4.12	13.70	13.88
286T	510																					
324TS	664	0.500	0.500	2.000	3.75	1.875	3.50	6.25	0.67	5.25	6.00	12.00	10.50	14.40	13.80	29.04	8.00	0.99	2.01	3.62	15.54	17.07
326TS	800																					
324T	664	0.500	0.500	3.880	5.25	2.125	5.00	6.25	0.67	5.25	6.00	12.00	10.50	14.40	13.80	30.54	8.00	0.99	2.01	3.62	15.54	17.07
326T	800																					
364TS	1122	0.500	0.500	2.000	3.75	1.875	3.50	7.00	0.69	5.88	6.13	12.25	11.25	16.00	14.40	32.76	9.00	1.09	2.26	3.40	17.00	19.02
365TS	1155																					
364T	1122	0.625	0.625	4.250	5.88	2.375	5.64	7.00	0.69	5.88	6.13	12.25	11.25	16.00	14.40	34.89	9.00	1.09	2.26	3.40	17.00	19.02
365T	1155																					
404TS	1580	0.500	0.500	2.750	4.25	2.125	4.00	8.00	0.81	6.62	6.88	13.75	12.25	18.00	16.00	36.76	10.00	1.29	2.64	4.00	19.02	21.18
405TS	1600																					
404T	1580	0.750	0.750	5.625	7.25	2.875	7.00	8.00	0.81	6.62	6.88	13.75	12.25	18.00	16.00	39.77	10.00	1.29	2.64	4.00	19.02	21.18
405T	1600																					
444TS	2100	0.625	0.625	3.000	4.75	2.375	4.50	9.00	0.81	7.50	8.25	16.50	14.50	20.00	18.80	41.87	11.00	1.49	2.64	4.97	21.37	23.94
445TS	2260																					
444T	2100	0.875	0.875	6.875	8.50	3.375	8.25	9.00	0.81	7.50	8.25	16.50	14.50	20.00	18.80	45.62	11.00	1.49	2.64	4.97	21.37	23.94
445T	2260																					
447TS	2610	0.625	0.625	3.000	4.75	2.375	4.50	9.00	0.81	7.50	12.50	25.00	20.00	20.00	27.30	50.37	11.00	1.49	2.64	8.81	25.62	23.94
449TS	3010																					
447T	2610	0.875	0.875	6.875	8.50	3.375	8.25	9.00	0.81	7.50	12.50	25.00	20.00	20.00	27.30	54.12	11.00	1.49	2.64	8.81	25.62	23.94
449T	3010																					
449LL	3010	0.875	0.875	4.500	6.75	3.375	6.50	9.00	0.81	7.50	12.50	25.00	20.00	20.00	27.30	53.37	11.00	1.49	2.64	8.70	25.62	23.94
449TS (HO)	3200	0.625	0.625	3.000	4.75	2.375	4.50									55.63						
449T (HO)	3400	0.875	0.875	6.875	8.50	3.375	8.25	9.00	0.81	7.50	–	25.00	–	20.24	27.31	59.30	11.00	1.49	2.70	5.26	–	24.04
449LL (HO)				4.500	6.75		6.50									58.52						

Notes:

1 Shaft diameters 1 1/2 inches and smaller will come within the limits of +0.000 inch, -0.0005 inch diameters 1 5/8 inches and larger +0.000 inch, -0.001 inch

3 Tolerance on “D” dimension for rigid base motors will be +0.000 inch, -0.060 inch.

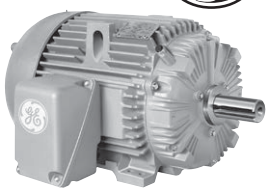
18 Motor feet have 2 holes per foot allowing NEMA F-1 or F-2 assembly while maintaining critical NEMA mounting dimensions. This does not apply to 449HO frames.

19 Providing mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward, or from either side Weights shown are approximate shipping weights and should be used for estimating only

XSD Ultra 841

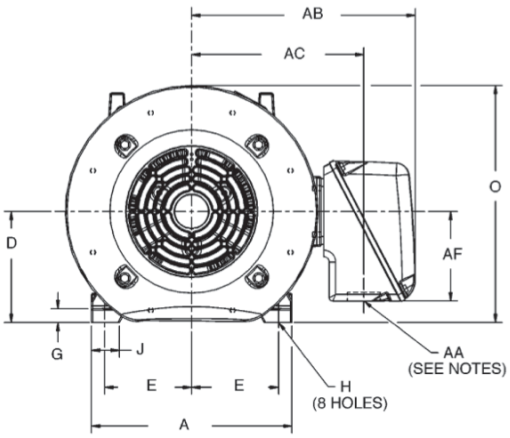
TEFC—Extra Severe Duty

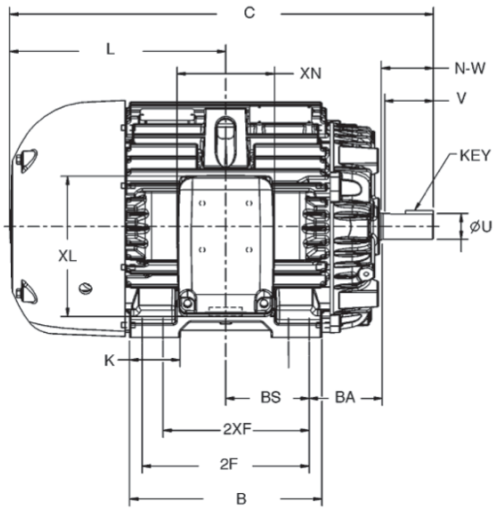
Dimensions



Frame dimensions on previous page

Cast Iron Construction/Frames 140-449, Type KS, 3-Phase/Dimensions—For estimating only

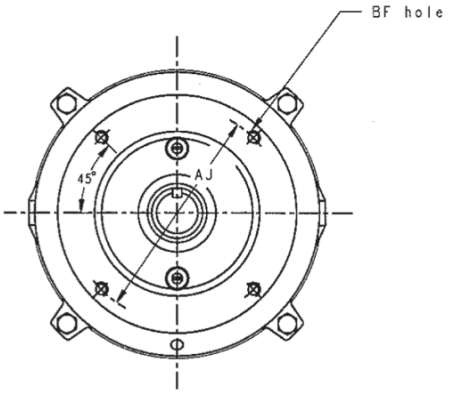




Conduit Box Dimensions

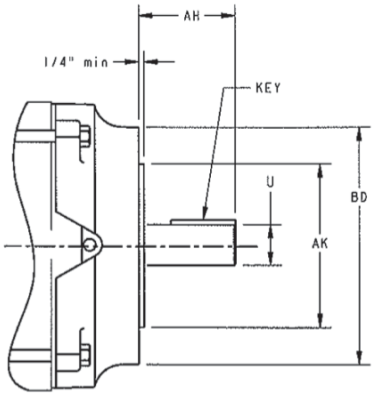
Frame	Nominal HP	Approx. Vol.	Dimensions in Inches					
			AA*	AB	AC	AF	XL	XN
143-145	2	32	0.75	6.62	5.12	2.50	4.30	5.40
182-184	5	32	0.75	7.82	6.32	2.50	4.30	5.40
213-215	10	55	1.00	9.50	7.42	3.50	5.78	4.16
254-256	20	140	1.25	11.68	9.12	4.59	7.37	5.37
284-286	30	140	1.50	12.44	9.88	4.59	7.37	5.37
324-326	50	346	3.00	16.13	12.43	6.44	10.14	7.00
364-365	75	346	3.00	17.07	13.37	6.44	10.14	7.00
404-405	125	700	3.00	20.48	16.22	7.00	12.13	10.50
444-449	200	700	3.00	22.00	17.74	7.00	12.13	10.50
	250	1260	2x 4.00	22.56	17.80	7.00	12.40	16.25

* A tapped NPT hole is provided for the conduit size listed in Column AA



C-Face Dimensions

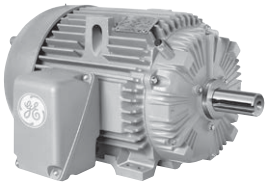
NEMA Frame	Dimensions in Inches						
	AH	AJ	AK	U	Key Width	Key Thickness	Key Length
143TC-145TC	2.12	5.88	4.50	0.88	0.19	0.19	1.38
182TC-184TC	2.62	7.25	8.50	1.13	0.25	0.25	1.75
213TC-215TC	3.12	7.25	8.50	1.38	0.31	0.31	2.38
254TC-256TC	3.75	7.25	8.50	1.63	0.38	0.38	2.88
284TC-286TC	4.38	9.00	10.50	1.88	0.50	0.50	3.25



XSD Ultra 661

TEFC—Extra Severe Duty (IP-56)
Heat Exchanger

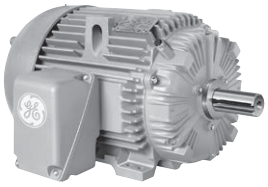
Standard Features



HP Range	5 - 75
Poles	4 pole
Voltage	460
Agency Approvals	UL - Component and Insulation System Recognition, CSA - Motors and C-390 (CE and ATEX Zone 2 by custom order)
Altitude	3300 ft
Ambient	40ºC
Balance/Vibration	1940 ISO Grade 1.0, Roller Bearings: 4P: 0.0004 in (P-P)
Bearing Caps	Cast iron and gasketed on both ends
Bearing Housing Rise	4 pole: 45ºC
Bearing Protection	Complete motor IP56 (exceeds API 661 requirement of IP55), Non-contact rotating labyrinth seal on both ends
Bearing Type	Roller bearing on DE only. Ball bearing on ODE.
Conduit Box	Gasketed and rotatable in 90 degree increments, Cast iron
Div 2 Temp Codes	Motors have an Auto Ignition Temperature of 200 degree C stamped on the nameplate. A Division 2 Nameplate can be provided (see kit section).
Drains	Stainless Steel T-drains in lowest section of both endshields
Efficiency	Meets or exceeds NEMA Premium nominal. Exceeds all NEMA Premium minimum efficiencies.
End Shield	Cast Iron
Fan	Non-Sparking Plastic
Fan Cover	Cast Iron
Fasteners	SAE, Grade 5
Foot Draft Angle	+/- 1.5 degrees
Foot Flatness	0.005 inches
Frame Material	Cast Iron
Frame Size	184-365
Frequency	60 Hz
Grease	Polyurea
Ground	Ground Lug in Conduit Box and Frame Ground
Industry Specifications	Meets IEEE 45 Marine Duty, Meets GM 7E-TA Automotive Duty, Exceeds API 661 specification
Insulation Class	Class H
Insulation System	GEGARD2400TM 143-449 frames. Non-Hygroscopic, Anti-Fungus, 2400Volt @ .1microsecond rise time. Exceeds NEMA MG1-31
Inverter Capabilities	Variable Torque inf:1
Bearing L10 Life	Belted - 40,000 hrs
Lifting Means	4 Lugs cast into frame
Mounting	180-320 frames all orientations. 360 frame stocked as shaft up. Shaft down available upon request.
Mounting Holes	2 per foot - All frames
Nameplate	Stainless Steel
NEMA Design	B
Oil Mist Lube	Includes provisions for conversion to Oil Mist Lubrication
Paint	Buff, Epoxy ester
Relubrication	Both ends, extended through the fan cover
Rotor	Cast Aluminum
Service Factor	1.15
Shaft TIR	Meets IEEE 841, .001 in for shaft diameter 1.625 in and smaller, .0015 in for shaft diameter greater than 1.625 in.
Special Painting	Meets IEEE 841
Temperature	Rise 80°C @ 1.0 SF
Tests	NEMA Routine only
Time Rating	Continuous
Vibration Pads	Cast in vibration pads for repeatable measurements
Warranty	60 months from date of installation or 66 months from date of manufacture, whichever occurs first

XSD Ultra 661

TEFC—Extra Severe Duty (IP-56)
Heat Exchanger



Volts: 460
HP: 5 - 75

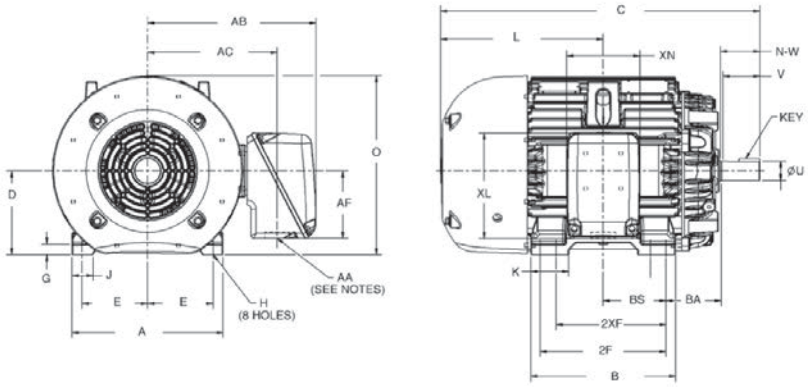
HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
5	1800	460	184T	**M6621**	5KS184XAA221W8	N	
7.5	1800	460	213T	**M6622**	5KS213XAA220W8	N	
10	1800	460	215T	**M6623**	5KS215XAA220W8	Y	
15	1800	460	254T	**M6624**	5KS254XAA221W8	Y	
20	1800	460	256T	**M6625**	5KS256XAA223W8	Y	
25	1800	460	284T	**M6626**	5KS284XAA220W8	Y	
30	1800	460	286T	**M6627**	5KS286XAA222W8	Y	
40	1800	460	324T	**M6628**	5KS324XAA271W8	Y	
50	1800	460	326T	**M6629**	5KS326XAA253W8	Y	
60	1800	460	364T	**M6630**	5KS364XAA250W6	N	118
60	1800	460	364T	**M6631**	5KS364XAA249W8	N	119
75	1800	460	365T	**M6632**	5KS365XAA253W6	N	118
75	1800	460	365T	**M6633**	5KS365XAA254W8	Y	119

Notes:
118 Shaft down mounting only
119 Shaft up mounting only

XSD Ultra 661

TEFC—Extra Severe Duty (IP-56)
Heat Exchanger

Dimensions



Common Motor Dimensions

Frame	Approx. Net Weight (in lbs)	Dimensions in inches																				
		Shaft						Mounting [18]														
		Key																				
		Width	Depth	Length	N-W	U [1]	V	E	H	BA	BS	2F	2XF	A	B	C	D [3]	G	J	K	L	O
184T	101	0.25	0.25	1.75	2.75	1.13	2.50	3.75	0.46	2.75	2.75	5.50	4.50	8.7	6.6	15.91	4.50	0.46	1.54	2.58	7.66	9.25
213T	200	0.31	0.31	2.38	3.38	1.38	3.12	4.25	0.46	3.50	3.50	7.00	5.50	9.6	8.0	20.15	5.25	0.57	1.47	3.12	9.77	10.43
215T	220	0.31	0.31	2.38	3.38	1.38	3.12	4.25	0.46	3.50	3.50	7.00	5.50	9.6	8.0	20.15	5.25	0.57	1.47	3.12	9.77	10.43
254T	315	0.38	0.38	2.38	4.00	1.63	3.76	5.00	0.58	4.25	5.00	10.00	8.30	11.2	11.3	25.59	6.25	0.65	1.52	3.93	12.34	12.50
256T	350	0.38	0.38	2.38	4.00	1.63	3.76	5.00	0.58	4.25	5.00	10.00	8.30	11.2	11.3	25.59	6.25	0.65	1.52	3.93	12.34	12.50
284T	460	0.50	0.50	3.25	4.62	1.88	4.38	5.50	0.58	4.75	5.50	11.00	9.50	12.4	12.8	28.58	7.00	0.76	1.75	4.12	13.70	13.88
286T	510	0.50	0.50	3.25	4.62	1.88	4.38	5.50	0.58	4.75	5.50	11.00	9.50	12.4	12.8	28.58	7.00	0.76	1.75	4.12	13.70	13.88
324T	670	0.50	0.50	3.88	5.25	2.13	5.00	6.25	0.67	5.25	6.00	12.00	10.50	14.4	13.8	32.04	8.00	0.99	2.01	3.62	15.54	17.07
326T	710	0.50	0.50	3.88	5.25	2.13	5.00	6.25	0.67	5.25	6.00	12.00	10.50	14.4	13.8	32.04	8.00	0.99	2.01	3.62	15.54	17.07
364T	1070	0.63	0.63	4.25	5.88	2.38	5.64	7.00	0.69	5.88	6.13	12.25	11.25	16.0	14.4	38.00	9.00	1.09	2.26	3.40	17.00	19.02
365T	1085	0.63	0.63	4.25	5.88	2.38	5.64	7.00	0.69	5.88	6.13	12.25	11.25	16.0	14.4	38.00	9.00	1.09	2.26	3.40	17.00	19.02

Notes:

1 Shaft diameters 1 1/2 inches and smaller will come within the limits of +0.000 inch, -0.0005 inch diameters 1 5/8 inches and larger +0.000 inch, -0.001 inch

3 Tolerance on "D" dimension for rigid base motors will be +0.000 inch, -0.060 inch.

18 Motor feet have 2 holes per foot allowing NEMA F-1 or F-2 assembly while maintaining critical NEMA mounting dimensions. Providing mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward, or from either side. Weights shown are approximate shipping weights and should be used for estimating only.

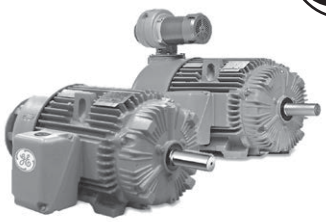
Conduit Box Dimensions

Frame	Nominal HP	Approx. Vol.	Dimensions in Inches					
			AA*	AB	AC	AF	XL	XN
182-184	5	32	0.75	7.82	6.32	2.50	4.30	5.40
213-215	10	55	1.00	9.50	7.42	3.50	5.78	4.16
254-256	20	140	1.25	11.68	9.12	4.59	7.37	5.37
284-286	30	140	1.50	12.44	9.88	4.59	7.37	5.37
324-326	50	346	3.00	16.13	12.43	6.44	10.14	7.00
364-365	75	346	3.00	17.07	13.37	6.44	10.14	7.00

* A tapped NPT hole is provided for the conduit size listed in Column AA

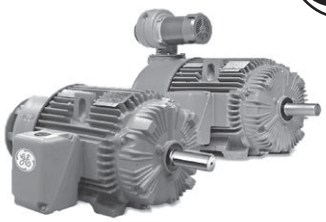
Adjustable Speed Motors
ASD Ultra®

Standard Features



HP Range	1.5 - 300
Poles	4 and 6
Voltage	230/460, 460
Agency Approvals	UL - Component and Insulation System Recognition, CSA - Motors
Altitude	3300 feet
Ambient	40°C
Balance/Vibration	0.040 in/sec (P) @ 60 Hz 0.055 in/sec (P) at others frequency
Bearing Housing Rise	65°C
Bearing Caps	Both ends. 143-286: ODE is gasketed, 324-449: both ends are gasketed
Bearing Protection	Aegis shaft ground ring installed inside the motor in DE bearing cap 140-449 frame. Recessed Slinger. Non-contact rotating labyrinth seal kit available
Bearing Type	Ball, roller bearing available as an option 360 frame and higher. Insulated Opposite Drive End Bearing 444-449 Frame.
Centered Core	Allows F1-F2 field conversion
Conduit Box	Gasketed and rotatable, Fabricated Steel above 250 Amps, All other: Cast iron
Cooling	143-182: Non-Vent, 184-449: Totally Enclosed Fan Cooled, 364-449: Blower Cooled also available.
DE Mounting	143-286: NEMA C-face mount
Drains	Stainless Steel T-drains
End Shield	Cast Iron—C-face std through 286 frame
Fan	Non-Sparking Plastic or Bronze
Fan Cover	Cast Iron
Fasteners	SAE, Grade 5
Foot Draft Angle	+/- 1.5 degrees
Foot Flatness	0.005 inches
Frame Material	Cast Iron
Frame Size	143-449
Frequency	60 Hz
Grease	Polyurea
Ground	Ground lug in Conduit Box
Insulation Class	H
Insulation System	GEGUARD 2400 Non-Hygroscopic, AntiFungus, 2400Volt @ .1microsecond rise time. Exceeds NEMA MG1-31
Inverter Capabilities	Variable Torque inf:1, Constant Torque inf:1, Constant Horsepower to 1.5 times base speed.
Bearing L10 Life	Belted - 26,280 hrs; Direct Coupled -130,000 hrs 4 Pole and above, 65,000 hrs 2 Pole
Lifting Means	4 Lugs cast into frame
Mounting	F1 as Standard and Modifiable to F2
Mounting Holes	1 per foot (324 frame), 2 per foot (all other frames)
Nameplate	Stainless Steel includes Weight, Vibration Limit, Service Factor, Speed Range, Constant Torque, and Constant HP
NEMA Design	NEMA A
Paint	Buff, Epoxy ester
Relubrication	Both ends, extended through the fan cover
Rotor	Cast Aluminum
Service Factor	1.0 SF for PWM operation
Shaft TIR	Meets IEEE 841, .001 in. for shaft diameter 1.625 in and smaller, .0015 in for shaft diameter greater than 1.625 in.
Tach Mounting	ODE C-face provision for tach mounting. 143-184: 4.5” rabbet, 213-449: 8.5” rabbet
Temperature Rise	80°C by resistance TEBC & TENV: 105°C by resistance TEFC
Tests	NEMA Routine Report including 100% CIV tested.
Thermal Protection	140-280, 2 NC Thermostats; 320-449, 3 NC Thermostats
Time Rating	Continuous
Vibration Pads	Cast in vibration pads for repeatable measurements
Warranty	60 months from date of installation or 66 months from date of manufacture, whichever occurs first Extended warranty from Electro Static Technology guarantees against bearing failure due to fluting damage for the expected (L10) life of the original bearings.

Adjustable Speed Motors
ASD Ultra®



Volts: 230/460, 460
HP: 1.5 - 300

ASD Totally Enclosed – Infinite: 1 Constant Torque Speed Range

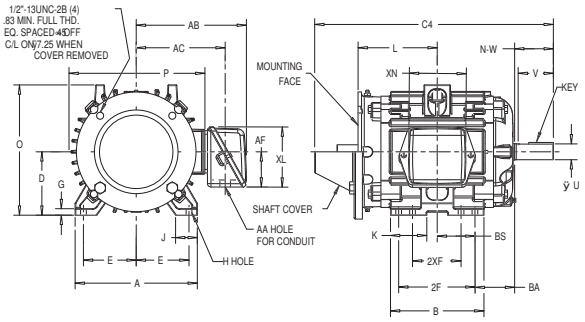
HP	RPM	Volts	Frame	Enclosure	Cat. No.	Model No.	Normally Stocked	Notes
1.5	1800	230/460	143TC	TENV	**M9300**	5KAF143SAA202	N	
2	1800	230/460	145TC	TENV	**M9301**	5KAF145SAA202	N	
3	1800	230/460	182TC	TENV	**M9302**	5KAF182SAA202	N	
5	1800	230/460	184TC	TEFC	**M9303**	5KAF184SAA202	N	
7.5	1800	230/460	213TC	TEFC	**M9304**	5KAF213SAA202	N	
10	1800	230/460	215TC	TEFC	**M9305**	5KAF215SAA202	N	
15	1800	230/460	254TC	TEFC	**M9306**	5KAF254SAA202	N	
20	1800	230/460	256TC	TEFC	**M9307**	5KAF256SAA202	N	
25	1800	230/460	284TC	TEFC	**M9308**	5KAF284SAA202	N	
25	1200	230/460	324T	TEFC	**M9328**	5KAF324SAA322	N	
30	1800	230/460	286TC	TEFC	**M9309**	5KAF286SAA202	N	
30	1200	230/460	326T	TEFC	**M9329**	5KAF326SAA322	N	
40	1800	230/460	324T	TEFC	**M9310**	5KAF324SAA222	N	
40	1200	230/460	364T	TEFC	**M9330**	5KAF364SAA322	N	
50	1800	230/460	326T	TEFC	**M9311**	5KAF326SAA222	N	
50	1200	230/460	365T	TEFC	**M9331**	5KAF365SAA323	N	
60	1800	230/460	364T	TEFC	**M9312**	5KAF364SAA222	N	
60	1800	230/460	364T	TEBC	**M9313**	5KAF364SAA223	N	
60	1200	230/460	404T	TEFC	**M9332**	5KAF404SAA323	N	
60	1200	230/460	404T	TEBC	**M9333**	5KAF404SAA324	N	
75	1800	230/460	365T	TEFC	**M9314**	5KAF365SAA223	N	
75	1800	230/460	365T	TEBC	**M9315**	5KAF365SAA224	N	
75	1200	230/460	405T	TEFC	**M9334**	5KAF405SAA323	N	
75	1200	230/460	405T	TEBC	**M9335**	5KAF405SAA331	N	
100	1800	230/460	405T	TEFC	**M9316**	5KAF405SAA221	N	
100	1800	230/460	405T	TEBC	**M9317**	5KAF405SAA220	N	
100	1200	460	444T	TEFC	**M9336**	5KAF444SAA321	N	103
100	1200	460	444T	TEBC	**M9337**	5KAF444SAA322	N	103
125	1800	460	444T	TEFC	**M9318**	5KAF444SAA220	N	103
125	1800	460	444T	TEBC	**M9319**	5KAF444SAA221	N	103
125	1200	460	445T	TEFC	**M9338**	5KAF445SAA321	N	103
125	1200	460	445T	TEBC	**M9339**	5KAF445SAA322	N	103
150	1800	460	445T	TEFC	**M9320**	5KAF445SAA220	N	103
150	1800	460	445T	TEBC	**M9321**	5KAF445SAA221	N	103
150	1200	460	447T	TEFC	**M9340**	5KAF447SAA322	N	103
150	1200	460	447T	TEBC	**M9341**	5KAF447SAA323	N	103
200	1800	460	447T	TEFC	**M9322**	5KAF447SAA220	N	103
200	1800	460	447T	TEBC	**M9323**	5KAF447SAA221	N	103
200	1200	460	449T	TEFC	**M9342**	5KAF449SAA324	N	103
200	1200	460	449T	TEBC	**M9343**	5KAF449SAA325	N	103
250	1800	460	449T	TEFC	**M9324**	5KAF449SAA221	N	103
250	1800	460	449T	TEBC	**M9325**	5KAF449SAA222	N	103
300	1800	460	449T	TEFC	**M9326**	5KAF449SAA223	N	103
300	1800	460	449T	TEBC	**M9327**	5KAF449SAA224	N	103

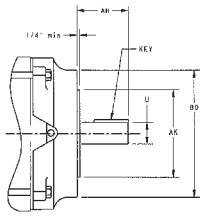
Notes:
103 Insulated O.D.E. bearing and shaft ground brush on DE

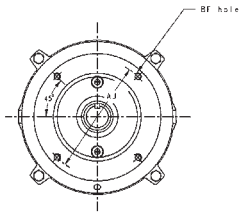
Adjustable Speed Motors
ASD Ultra®

Dimensions

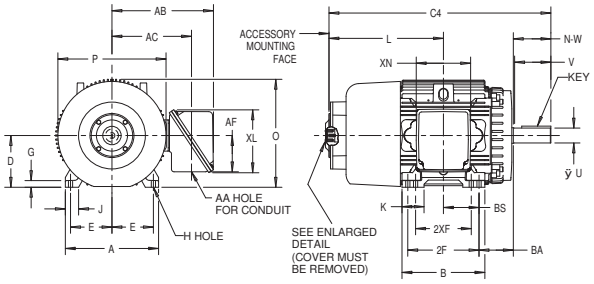
140-180 Frame (Tenv)

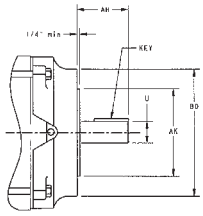


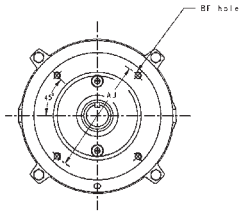


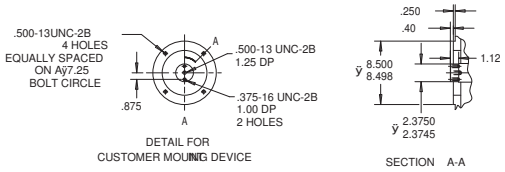


360-5013 Frame (TEFC)

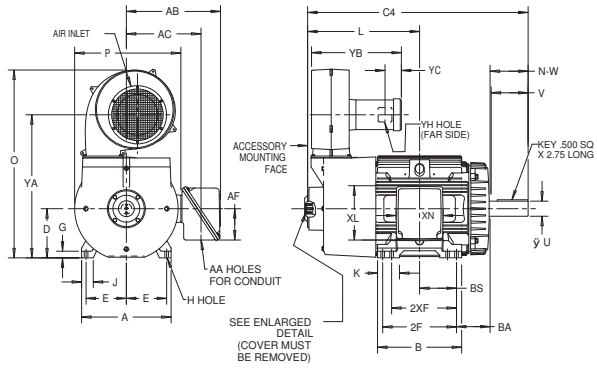


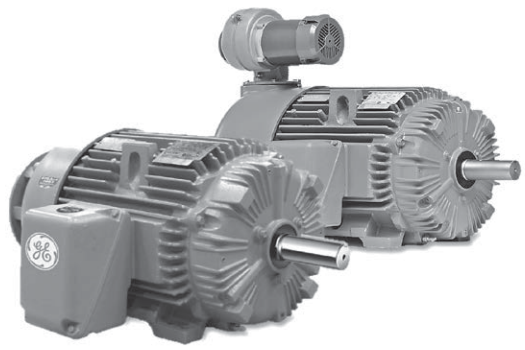


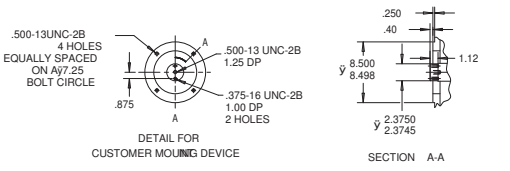




364-5013 Frame (TEBC)







Adjustable Speed Motors
ASD Ultra®

Dimensions (cont.)

Dimensions refer to drawings on previous page

TENV Dimensions

Frame	Net Wt. Lbs	Shaft						Mounting[25]															
		Keyway		Key Length	N-W	U[19]	V[20]	E	H	BA	BS	2F	2XF	A	B	C	D[21]	G	J	K	L	O	P
		W	D																				
143TC	43	0.187	0.0935	1.38	2.13	0.88	2.12	2.75	0.37	2.75	2.50	–	4.00	6.88	5.88	13.32	3.50	0.40	1.39	2.32	5.25	7.25	7.34
145TC	43	0.187	0.0935	1.38	2.13	0.88	2.12	2.75	0.37	2.75	2.50	5.00	–	6.88	5.88	13.32	3.50	0.40	1.39	2.32	5.25	7.25	7.34
182TC	76	0.250	0.1250	1.75	2.63	1.12	2.62	3.75	0.46	3.5	2.75	–	4.50	8.68	6.64	16.95	4.50	0.46	1.54	2.58	6.38	9.25	9.50

TEFC Dimensions

Frame	Net Wt. Lbs	Shaft						Mounting[25]															
		Keyway		Key Length	N-W	U[19]	V[20]	E	H	BA	BS	2F	2XF	A	B	C	D[21]	G	J	K	L	O	P
		W	D																				
184TC	101	0.250	0.1250	1.75	2.62	1.12	2.62	3.75	0.46	3.50	2.75	5.50	–	8.68	6.64	19.36	4.50	0.46	1.54	2.58	8.78	9.54	9.92
213TC	200	0.310	0.1560	2.38	3.13	1.38	3.38	4.25	0.46	4.25	3.50	–	5.50	9.60	8.00	24.00	5.25	0.57	1.47	3.12	11.23	11.00	11.37
215TC	220	0.310	0.1560	2.38	3.13	1.38	3.38	4.25	0.46	4.25	3.50	7.00	–	9.60	8.00	24.00	5.25	0.57	1.47	3.12	11.23	11.00	11.37
254TC	315	0.380	0.1900	2.88	4.00	1.62	3.75	5.00	0.53	4.75	5.00	–	8.25	11.20	11.30	29.32	6.25	0.65	1.52	3.93	13.93	12.88	13.25
256TC	350	0.380	0.1900	2.88	4.00	1.62	3.75	5.00	0.53	4.75	5.00	10.00	–	11.20	11.30	29.32	6.25	0.65	1.52	3.93	13.93	12.88	13.25
284TC	460	0.500	0.2500	3.25	4.38	1.88	4.38	5.50	0.53	5.25	5.50	–	9.50	12.40	12.80	32.14	7.00	0.80	1.75	4.12	18.76	14.29	14.50
286TC	510	0.500	0.2500	3.25	4.38	1.88	4.38	5.50	0.53	5.25	5.50	11.00	–	12.40	12.80	32.14	7.00	0.80	1.75	4.12	18.76	14.29	14.50
324T	685	0.500	0.1900	3.88	5.25	2.12	5.00	6.25	0.66	5.25	5.50	–	10.50	14.40	12.30	32.81	8.00	1.00	2.02	2.88	20.15	17.05	18.38
326T	740	0.500	0.1900	3.88	5.25	2.13	5.00	6.25	0.66	5.25	6.00	12.00	–	14.40	13.80	34.31	8.00	1.00	2.01	3.63	20.90	17.07	18.38
364T	965	0.625	0.2500	4.25	5.88	2.38	5.62	7.00	0.69	5.88	6.12	–	11.25	16.00	14.40	37.93	9.00	1.10	2.26	3.40	23.12	19.02	20.34
365T	1070	0.625	0.2500	4.25	5.88	2.38	5.62	7.00	0.69	5.88	6.12	12.25	–	16.00	14.40	37.93	9.00	1.10	2.26	3.40	23.12	19.02	20.34
405T	1560	0.750	0.3750	5.62	7.25	2.88	7.00	8.00	0.81	6.62	6.88	13.75	–	18.00	16.00	42.51	10.00	1.30	2.64	4.00	24.85	22.97	21.29
444T	2050	0.875	0.4400	6.88	8.50	3.38	8.25	9.00	0.81	7.50	8.25	–	14.50	20.00	18.80	49.33	11.00	1.50	2.64	4.90	25.69	22.98	24.22
445T	2050	0.875	0.4400	6.88	8.50	3.38	8.25	9.00	0.81	7.50	8.25	16.50	–	20.00	18.80	49.33	11.00	1.50	2.64	4.90	25.69	22.98	24.22
447T	2830	0.875	0.4400	6.88	8.50	3.38	8.25	9.00	0.81	7.50	12.50	–	20.00	20.00	27.30	57.83	11.00	1.50	2.64	8.81	32.41	24.80	27.11
449T	3110	0.875	0.4400	6.88	8.50	3.38	8.25	9.00	0.81	7.50	12.50	25.00	–	20.00	27.30	57.83	11.00	1.50	2.64	8.81	32.41	24.80	27.11

TEBC Dimensions

Frame	Net Wt. Lbs	Shaft						Mounting[25]															
		Keyway		Key Length	N-W	U[19]	V[20]	E	H	BA	BS	2F	2XF	A	B	C	D[21]	G	J	K	L	O	P
		W	D																				
364T	965	0.625	0.250	4.25	5.88	2.38	5.62	7.00	0.69	5.88	6.12	–	11.25	16.00	14.40	41.01	9.00	1.10	2.26	3.40	23.12	29.66	20.34
365T	1025	0.625	0.250	4.25	5.88	2.38	5.62	7.00	0.69	5.88	6.12	12.30	–	16.00	14.40	41.01	9.00	1.10	2.26	3.40	23.12	29.66	20.34
405T	1600	0.750	0.250	5.63	7.25	2.88	7.00	8.00	0.81	6.62	6.88	13.75	–	18.00	16.00	45.59	10.00	1.30	2.64	4.0	24.85	30.66	22.94
444T	1750	0.875	0.310	6.88	8.50	3.38	8.25	9.00	0.81	7.50	8.25	–	14.50	20.00	18.80	50.69	11.00	1.50	2.64	4.90	28.16	40.66	27.31
445T	2000	0.875	0.310	6.88	8.50	3.38	8.25	9.00	0.81	7.50	8.25	16.50	–	20.00	18.80	50.69	11.00	1.50	2.64	4.90	28.16	40.66	27.31
449T[26]	2650	0.875	0.440	6.88	8.50	3.38	8.25	9.00	0.81	7.50	12.50	25.00	–	20.00	37.30	60.91	11.00	1.50	2.64	8.81	32.41	40.66	27.31

Notes:

19 Shaft diameters 1.5 inches and smaller will come within the limits of +0.000 inch -0.0005 inch; diameters 1.625 inches and larger +0.000 inch -0.001 inch

20 Dimension “V” represents length of straight part of shaft extension

21 Tolerance on “D” dimension will be: On frames 182T-362T +0.000 inch -0.032 inch; On frames 364T-449T +0.000 inch -0.060 inch

25 Motor feet have 2 holes = per foot allowing NEMA F-1 or F-2 assembly while maintaining critical NEMA dimensions

26 Cast iron motors in 449 frame also have mounting holes meeting 447 frame dimensions

Adjustable Speed Motors
ASD Ultra®

Dimensions (cont.)

Conduit Box Dimensions

Frame	Normal HP(40)	Approx. Volume	AA	AB	AC (23)	AF	XL	XN
182T-184T	5	32	0.75	7.83	6.32	2.50	4.30	5.40
213T-215T	10	32	1.00	9.50	7.42	3.50	5.78	4.16
254T-256T	20	76	1.25	12.15	9.12	4.59	7.38	5.38
284T-286T	30	137	1.50	12.91	9.88	4.59	7.38	5.38
324T-326T	50	346	3.00	16.13	12.43	6.44	10.12	7.00
364T-365T	75	346	3.00	17.13	13.43	6.44	10.12	7.00
404T-405T	100	700	3.00	20.54	16.28	7.00	12.13	10.50
444T-449T	300	1260	4.00	22.06	17.80	7.00	12.35	16.25

Notes:
23 Insulated ODE bearing and shaft ground brush on DE
40 Conduit box size is determined by full load amps. Nominal horsepower is stated as a reference only. Providing mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward or from either side.

Blower Dimensions

Frame	YA	YB	YE	YH
364T-365T	25.22	13.54	3.57	0.875
404T-405T	27.58	13.54	2.84	0.875
444T-449T	33.95	20.08	2.44	1.094

C-Face Mounting

	All Dimensions in Inches						
NEMA Frame	AH	AJ	AK	U	Key Width	Key Thickness	Key Length
143TC-145TC	2.12	5.88	4.50	0.875	0.19	0.19	1.38
182TC-184TC	2.62	7.25	8.50	1.125	0.25	0.25	1.75
213TC-215TC	3.12	7.25	8.50	1.375	0.31	0.31	2.38
254TC-256TC	3.75	7.25	8.50	1.625	0.38	0.38	2.88
284TC-286TC	4.38	9.00	10.50	1.875	0.50	0.50	3.25

Adjustable Speed Motors
ASD Ultra®

Kits and Accessories

C-Face Kits

Part No.	Frame	Poles	Cat. No.
249A4321AMG01	324T-326T	4-6	**A761**
249A4321AMG03	364T-365T	4-6	**A763**
249A4321AMG05	404T-405T	4-6	**A765**
249A4321AMG07	444T-445T	4-6	**A767**

Non-Contact Rotating Labyrinth Seal Kits

Part No.	Frame	Cat. No.
4002B5914AN1	140T-145T	**A1001**
4002B5914AN2	182T-184T	**A1002**
4002B5914AN3	213T-215T	**A1003**
4002B5914AN4	254T-256T	**A1004**
4002B5914AN5	284T-286T	**A1005**
235A4575GE1	320T	**A826**
235A4575GE3	360T	**A828**
235A4575GE5	400T	**A830**
235A4575GE7	440T	**A832**

Adjustable Speed Motors
ASD Ultra®

Kits and Accessories (cont.)

Encoder Kits

Part No.	Frame	Brand	Model	PPR	VDC	Connector	Output	Cat. No.		
153B4404CS2	140	Avtron	HS35A Optical Encoder with basket guard	1024	5-28V	10 Pin MS "A" with plug	Single	**A150**		
153B4404CS3	140	Avtron	HS35A Optical Encoder with basket guard	2048	5-28V	10 Pin MS "A" with plug	Single	**A151**		
153B4404CW1	140	Avtron	HS35M Magnetic Encoder with basket guard	1024	5-28V	10 Pin MS "A" with plug	Single	**A154**		
153B4404CW2	140	Avtron	HS35M Magnetic Encoder with basket guard	2048	5-28V	10 Pin MS "A" with plug	Single	**A155**		
153B4404DB1	140	Dynapar	HS35R Optical Encoder with basket guard	1024	5-26V in/out	10 Pin + Mating	Single	**A170**		
153B4404DB2	140	Dynapar	HS35R Optical Encoder with basket guard	2048	5-26V in/out	10 Pin + Mating	Single	**A171**		
153B4404DA1	140	Dynapar	NorthStar SLIM Tach SL56 Magnetic	512	5-15V in/out	Latching Connector w/ 1/2" NPT	Single	**A172**		
153B4404DA2	140	Dynapar	NorthStar SLIM Tach SL56 Magnetic	1024	5-15V in/out	Latching Connector w/ 1/2" NPT	Single	**A173**		
153B4404DA3	140	Dynapar	NorthStar SLIM Tach SL56 Magnetic	512	5-15V in/out	Latching Connector w/ 1/2" NPT	Dual	**A174**		
153B4404DA4	140	Dynapar	NorthStar SLIM Tach SL56 Magnetic	1024	5-15V in/out	Latching Connector w/ 1/2" NPT	Dual	**A175**		
153B4404CS4	180-360	Avtron	HS35A Optical Encoder with basket guard	1024	5-28V	10 Pin MS "A" with plug	Single	**A152**		
153B4404CS5	180-360	Avtron	HS35A Optical Encoder with basket guard	2048	5-28V	10 Pin MS "A" with plug	Single	**A153**		
153B4404CW3	180-360	Avtron	HS35M Magnetic Encoder with basket guard	1024	5-28V	10 Pin MS "A" with plug	Single	**A156**		
153B4404CW4	180-360	Avtron	HS35M Magnetic Encoder with basket guard	2048	5-28V	10 Pin MS "A" with plug	Single	**A157**		
153B4404CT13	180-360	Avtron	AV850 SMARTTach II Magnetic Modular Encoder	1024	5-24V in/ 5-15V out	Industrial Connector w/ 1/2" NPT	Single	**A158**		
153B4404CT15	180-360	Avtron	AV850 SMARTTach II Magnetic Modular Encoder	2048	5-24V in/ 5-15V out	Industrial Connector w/ 1/2" NPT	Single	**A160**		
153B4404CT17	180-360	Avtron	AV850 SMARTTach II Magnetic Modular Encoder	1024	5-24V in/ 5-15V out	Industrial Connector w/ 1/2" NPT	Dual	**A162**		
153B4404CT19	180-360	Avtron	AV850 SMARTTach II Magnetic Modular Encoder	2048	5-24V in/ 5-15V out	Industrial Connector w/ 1/2" NPT	Dual	**A164**		
153B4404DD1	180-360	Dynapar	NorthStar SLIM Tach SL85 Magnetic	512	5-15V in/out	Latching Connector w/ 1/2" NPT	Single	**A176**		
153B4404DD2	180-360	Dynapar	NorthStar SLIM Tach SL85 Magnetic	1024	5-15V in/out	Latching Connector w/ 1/2" NPT	Single	**A177**		
153B4404DD3	180-360	Dynapar	NorthStar SLIM Tach SL85 Magnetic	512	5-15V in/out	Latching Connector w/ 1/2" NPT	Dual	**A178**		
153B4404DD4	180-360	Dynapar	NorthStar SLIM Tach SL85 Magnetic	1024	5-15V in/out	Latching Connector w/ 1/2" NPT	Dual	**A179**		
153B4404DC1	180-360	Dynapar	NorthStar RIM Tach 8500 NexGen Magnetic	1024	5-15V in/out	Latching Connector w/ 1/2" NPT	Single	**A180**		
153B4404DC3	180-360	Dynapar	NorthStar RIM Tach 8500 NexGen Magnetic	1024	5-15V in/out	Latching Connector w/ 1/2" NPT	Dual	**A182**		
153B4404CT14	440	Avtron	AV850 SMARTTach II Magnetic Modular Encoder	1024	5-24V in/ 5-15V out	Industrial Connector w/ 1/2" NPT	Single	**A159**		
153B4404CT16	440	Avtron	AV850 SMARTTach II Magnetic Modular Encoder	2048	5-24V in/ 5-15V out	Industrial Connector w/ 1/2" NPT	Single	**A161**		
153B4404CT18	440	Avtron	AV850 SMARTTach II Magnetic Modular Encoder	1024	5-24V in/ 5-15V out	Industrial Connector w/ 1/2" NPT	Dual	**A163**		
153B4404CT20	440	Avtron	AV850 SMARTTach II Magnetic Modular Encoder	2048	5-24V in/ 5-15V out	Industrial Connector w/ 1/2" NPT	Dual	**A165**		
153B4404DC2	440	Dynapar	NorthStar RIM Tach 8500 NexGen Magnetic	1024	5-15V in/out	Latching Connector w/ 1/2" NPT	Single	**A181**		
153B4404DC4	440	Dynapar	NorthStar RIM Tach 8500 NexGen Magnetic	1024	5-15V in/out	Latching Connector w/ 1/2" NPT	Dual	**A183**		

XSD Ultra Family

Kits and Accessories

C-Face Kits - XSD Ultra

Cat. No.	Part No.	Frame
PB14A*	4001A5202AA-G01	143T-145T
PB18A*	4001A5202AA-G02	182T-184T
PB21A*	4001A5202AA-G03	213T-215T
PB25A*	4001A5202AA-G04	254T-256T
PB28A	4001A5202AA-G05	284T-286T, 284TS-286TS
A761	249A4321AMG01	324T-326T, 324TS-326TS
A763	249A4321AMG03	364T-365T, 364TS-365TS
A765	249A4321AMG05	404T-405T
A766**	249A4321AMG06	404TS-405TS
A767	249A4321AMG07	444T-449T
A768**	249A4321AMG08	444TS-449TS

Notes:
143-256 frame will not meet NEMA BA dimension using C-Face kit
* XSD Ultra C-Face kits will not have endshield machined for non-contact rotating labyrinth seal
** 2-pole only. For 4-pole and higher contact your dealer

D Flange Kits - XSD Ultra

Cat. No.	Part No.	Frame
A991	249A4321ARG01	324T-326T, 324TS-326TS
A995	249A4321ARG05	404T-405T
A996**	249A4321ARG06	404TS-405TS
A997	249A4321ARG07	444T-449T
A998**	249A4321ARG08	444TS-449TS

Notes:
XSD Ultra D-Flange kits will not have end shield machined for non-contact rotating labyrinth seal
364-365 frame D flange motors are available by custom order
** 2-pole only. For 4-pole and higher contact your dealer

Division 2 Nameplate - XSD Ultra

A standard auxiliary tag is provided on the motor which states: “Maximum exposed internal and external surface temperatures shall not exceed 200 Degree C under usual service conditions (sine wave power) at 1.0 SF.” If required, a UL Div 2 nameplate may be ordered as a custom feature. The new

motor. For installing this nameplate on stock motors, please consult with your Emporium Energy epresentative.

Drip Cover Kits - XSD Ultra, Ultra 841, Ultra 661

Cat. No.	Part No.	Frame
A1201	249A4267AD-G01	140
A1202	249A4267AD-G02	180
A1203	249A4267AD-G03	210
A1204	249A4267AD-G04	250
A1205	249A4267AD-G05	280
A1206	249A4267AD-G06	320

Notes:
364-449 frame motors available for vertical mounting by custom order

XSD Ultra Family

Kits and Accessories (cont.)

Ground Terminal Post - XSD Ultra and 500 Frames

The Ground Terminal Post replaces a bolt on the drive-end endshield allowing for an external frame ground

Cat. No.	Part No.	Frame
A340	4001A5921CYG006	140
A341	4001A5921CYG001	180-250
A342	4001A5921CYG002	280
A343	249A4234AA-G20	320
A344	249A4234AA-G03	364-405
A345	249A4234AA-G21	444-449
A346	249A4234AA-G07	500

Notes:
XSD Ultra 841 and Ultra 661 motors have the ground terminal post standard

Low Profile Non-Contact Rotating Labyrinth Seal Kits - XSD Ultra

Cat. No.	Part No.	Frame
A1001	4002B5914AN1	140T-145T
A1002	4002B5914AN2	182T-184T
A1003	4002B5914AN3	213T-215T
A1004	4002B5914AN4	254T-256T
A1005	4002B5914AN5	284T-286T, 284TS-286TS
A826	235A4575GE1	324T-326T
A1007	235A4575GS1	324TS-326TS
A828	235A4575GE3	364T-365T
A829	235A4575GE4	364TS-365TS
A830	235A4575GE5	404T-405T
A831	235A4575GE6	404TS-405TS
A832	235A4575GE7	444T-449T
A833	235A4575GE8	444TS-449TS

Notes:
XSD Ultra 841 and XSD Ultra 661 have DE and ODE non-contact rotating labyrinth seals standard

XSD Ultra Family

Kits and Accessories (cont.)

Thermostatically Controlled Space Heater Kits (Division 2 Hazardous Locations)—XSD Ultra, Ultra 841, Ultra 661, 500 Frames

GE has developed and patented a thermostatically controlled space heater. These heaters operate with a maximum surface temperature of 155 degrees C and are provided with a hermetically sealed thermostat so they do not spark. In most cases when a motor is shut down, the space heaters are immediately turned on. As the motor may take many hours to cool down, the heaters being automatically turned on can result in a cumulative temperature that exceeds the 80% Auto-Ignition Temperature (A.I.T.) limit for temperature code T3. These thermostatically controlled heaters will not allow the heater to energize until the motor has sufficiently cooled down (below 140C thermostat reset temperature) thereby not allowing the temperatures to exceed the limit and conserving energy.

Cat. No.	Part No.	Frame	Voltage
A284	235A4753BF1	182-184	110-120
A285	235A4753BF2	182-184	220-240
A286	235A4753BF4	182-184	440-480
A287	235A4753BG1	213-286	110-120
A288	235A4753BG2	213-286	220-240
A289	235A4753BG3	213-286	440-480
A290	235A4753BH1	324-405	110-120
A291	235A4753BH2	324-405	220-240
A292	235A4753BH3	324-405	440-480
A293	235A4753BJ1	444-449	110-120
A294	235A4753BJ2	444-449	220-240
A295	235A4753BJ3	444-449	440-480
A296	235A4753BK1	509-5013	110-120
A297	235A4753BK2	509-5013	220-240
A298	235A4753BK3	509-5013	440-480

Thermostat Kit - XSD Ultra, Ultra 841, Ultra 661

Cat. No.	Part No.	Opening Temperature	Temp Class
A337	153B1004AC-G120	155-165°C	F

Single thermostat with leads are 29" long with terminals

XSD Ultra Family

Kits and Accessories (cont.)

Sliding Bases for 143-445 Frame Motors

Bases are suitable for the indicated frame size and are suitable for the majority of floor-mounted, belt connected motors. The bases are not suitable for ceiling or side-wall mounting installations. Number of adjusting screws is identified in the table.

Cat. No.	Part No.	Frame	No. of Adjusting Screws
A125	235A2321AB1	143	2
A126	235A2321AB2	145	2
A127	235A2321AB3	182	2
A128	235A2321AB4	184	2
A129	235A2321AB5	213	2
A130	235A2321AB6	215	2
A131	235A2321AB7	254	2
A132	235A2321AB8	256	2
A133	235A2321AB9	284	2
A134	235A2321AB10	286	2
A135	235A2321AB11	324	2
A136	235A2321AB12	326	2
A137	235A2321AB13	364	2
A138	235A2321AB14	365	2
A139	235A2321AB15	404	2
A140	235A2321AB16	405	2
A141	235A2321AB17	444	2
A142	235A2321AB18	445	2

XSD Ultra Family

Checklist for value

Complete Test per MG1 Part 12 IEEE Standard 112, Test Method B on 2% of all production. Verification of compliance and routine test report supplied with every XSD Ultra motor

Charged lube system with Polyurea grease decreases the potential for contaminants in the lubricant

Dual mounting holes provide for application versatility and reduce inventory

Four point cast-in lifting lugs eliminate lost eye bolts and make mounting easier and safer

Stock XSD Ultra motors can be UL listed for Division 2 locations or modified to meet ATEX Zone 2 or CE requirements

Stainless steel combination breather/drains allow condensation to drain from motor

Five year warranty (60/66 months) is standard. This comprehensive warranty program covers both mechanical and efficiency performance

Rugged cast iron frame, conduit box and fan cover are resistant to process industry environments for extended motor life

Epoxyester paint system stands up to corrosive environments and meets the IEEE 841 paint requirements

Rigid and recessed severe-duty shaft slinger provides bearing system protection. (XSD Ultra 841 and Ultra 661 motors have non rotating seal/bearing isolator on the drive end). Field modifiable to a non-contact rotating seal on the drive-end

Corrosion resistant SAE Grade 5 hardware is rugged and designed for ease of the motor service

Grease fittings and plugs provide relubrication access to extend bearing life

Embossed 316 stainless steel nameplate stamped with superior operational and maintenance information.

Permanently labeled, non-wicking Class H leads make connections and installation easy

Lead gasket and conduit box cover gasket prevent moisture and contaminants from entering motor

Cast-in vibration pads provide five point vibration probe mounting locations (four radial and one axial)

Single shielded bearings on both ends open towards the grease cavity allowing maximum opportunity for grease circulation within the confines of the GE Six Star Bearing System

130,000 hour L10 direct connected and 26,280 hour L10 belted bearing life increases up-time and decreases repair costs

Oversized gasketed conduit box reduces the possibility of moisture in the conduit box

Precision Plus balance to 0.04 in/sec results in smooth, reliable operation and extends bearing life

Cast iron bearing cap with gasket retains lubricant and protects the interior of the motor and the bearing system from contaminants

New finned endshields (324-449 Frames) for improved heat dissipation and long bearing life

Non-sparking corrosion resistant fan is quiet and energy efficient

Premium efficiency lowers annual energy cost and extends motor life without any sacrifice in NEMA B performance

GEGARD2400 insulation system is manufactured with Class H materials and is designed to exceed the IGBT requirements of NEMA MG1-31

Extended grease fittings and grease filler tubes charged with Polyurea grease make maintenance safer and easier

ISO 1940 Grade 1.0 Precision Plus balance for low vibration

Temperature resistant Polyurea bearing grease suitable for temperatures of -40 to +120° C

Fan covers on frames 324 through 449 are designed with axial mounting bolts to ensure a more rugged installation

Grounding terminal in conduit box adds to safety during installation and service

Stator core centered in the frame enabling conversion to F2 mounting

Low temperature rise design increases bearing life

ND
NEMA Design D High Slip Motors

WOLONG
Power your future

ND.3 Oil Well Pump Motors (IP55)
ND.3 Standard Features
ND.4 Pricing



WOLONG

Power your future



Energy Saver SD Motors

NEMA B premium efficient, rugged and reliable designs ideal for severe duty applications.

Cast Iron Frames

These motors are used in a wide range of applications in extreme industrial environments such as petroleum, chemical, pulp and paper, water and wastewater, mining and mineral processing , among others.

Aluminum Frames

These motors are widely used in a diverse range of applications from food and beverage to water and wastewater, HVAC, and refrigeration among others. Benefits of aluminum over cast iron include, high resistance to most kinds of environmental corrosion, cooler running, and lighter weight.

www.emporiumve.com

WOLONG
Power your future

NEMA Design D

Oil Well Pump Motors (IP55)
Wolong Branded



Standard Features

HP Range	3 - 150
Poles	6
Voltage	460
Agency Approvals	CSA Certification
Altitude	3300 ft
Ambient	40ºC
Bearing Type	Roller on 360-447, Ball on 210-320
Conduit Box Hole Thread	NPT
Conduit Box Material	Cast Iron
Conduit Box Rotation	90 degree increments
End Shield Material	Cast Iron
Frame Material	Cast Iron
Frame Size	213-447
Insulation Class	F
Inverter Capability	Yes
Lifting Means	Eyebolt
Mounting	F2 (Field modifiable to F1)
NEMA Design	D 5-8% slip
Paint	Anti-corrosive based upon Alkyd High Build
Service Factor	1.15 Sine Wave
Shaft Extension	T
Warranty	12 months from date of installation or 18 months from date of manufacture, whichever occurs first
Winding Temperature Rise	80ºC at 1.0 SF

WOLONG
Power your future

NEMA Design D

Oil Well Pump Motors (IP55)
Wolong Branded
F2 Mounting



Volts: 460
HP: 3 - 150

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
3	1200	460	213T	**S2000**	5KR213SCG308	Y	199
3	1200	460	213T	**W1100**	5KR213ZWL308	Y	199
3	900	460	215T	**W1144**	5KR215ZWL408	N	
5	1200	460	215T	**W1101**	5KR215ZWL308	Y	
5	900	460	254T	**W1145**	5KR254ZWL408	N	
7.5	1200	460	254T	**W1102**	5KR254ZWL308	Y	
7.5	900	460	256T	**W1146**	5KR256ZWL408	N	
10	1200	460	256T	**S2003**	5KR256SCG308	Y	199
10	1200	460	256T	**W1103**	5KR256ZWL308	Y	199
10	900	460	284T	**W1147**	5KR284ZWL408	N	
15	1200	460	284T	**W1104**	5KR284ZWL308	Y	
15	900	460	286T	**W1148**	5KR286ZWL408	N	
20	1200	460	286T	**S2005**	5KR286SCG308	Y	199
20	1200	460	286T	**W1105**	5KR286ZWL308	Y	199
20	900	460	324T	**W1149**	5KR324ZWL408	N	
25	1200	460	324T	**W1106**	5KR324ZWL308	Y	
25	900	460	326T	**W1150**	5KR326ZWL408	N	
30	1200	460	326T	**W1107**	5KR326ZWL308	Y	
30	900	460	365T	**W1151**	5KR365ZWL408	N	
40	1200	460	364T	**W1108**	5KR365ZWL308	Y	
40	900	460	404T	**W1152**	5KR404ZWL408	N	
50	1200	460	404T	**W1109**	5KR404ZWL308	Y	
50	900	460	405T	**W1153**	5KR405ZWL408	N	
60	1200	460	404T	**W1110**	5KR405ZWL308	Y	
60	900	460	444T	**W1154**	5KR444ZWL408	N	
75	1200	460	444T	**W1111**	5KR444ZWL308	Y	
75	900	460	445T	**W1155**	5KR445ZWL408	N	
100	1200	460	444T	**W1112**	5KR445ZWL308	Y	
100	900	460	447T	**W1156**	5KR447ZWL408	N	
125	1200	460	445T	**W1113**	5KR447ZWL308	Y	
125	900	460	449T	**W1157**	5KR449ZWL408	N	
150	1200	460	447T	**W1114**	5KR449ZWL308	N	

Notes:
199 Sell “S” catalog numbers first. When depleted these are replaced with equivalent “W” catalog number.

XP Energy Saver
Premium Efficient Explosion Proof Motors

XP.3 Energy Saver Explosion Proof
XP.3 Standard Features
XP.4 Pricing
XP.6 C-Face Pricing
XP.7 Dimensions



WOLONG

Power your future



Energy Saver SD Motors

NEMA B premium efficient, rugged and reliable designs ideal for severe duty applications.

Cast Iron Frames

These motors are used in a wide range of applications in extreme industrial environments such as petroleum, chemical, pulp and paper, water and wastewater, mining and mineral processing , among others.

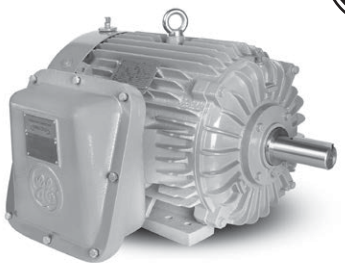
Aluminum Frames

These motors are widely used in a diverse range of applications from food and beverage to water and wastewater, HVAC, and refrigeration among others. Benefits of aluminum over cast iron include, high resistance to most kinds of environmental corrosion, cooler running, and lighter weight.

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Energy Saver Explosion Proof
Low Voltage

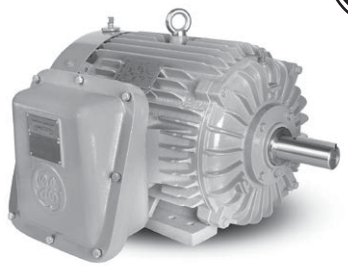
Standard Features



Div 1, Class I, Groups C and D; Class II, Groups F and G

HP Range	1.5 - 250
RPM	3600, 1800, 1200
Voltage	230/460, 460
Altitude	3300 ft
Ambient	-20°C to +40°C with SF of 1.15
Rotation	Bi Directional
Bearing Type	Ball bearing (roller bearing 150 and 200HP, 1200RPM)
Conduit Box	Cast Iron, Diagonally Split, Rotatable 90 degrees
Division 1 Hazardous Areas	Class I Groups C & D, Class II Groups F & G, T3C Temperature Code
Insulation Protection	Normally closed class B thermostats one per phase
Efficiency	NEMA Premium IEEE112 method B
Fan Cover	Steel
End Shield	Cast Iron
Frame Material	Cast Iron
Frame Size	143-449T
Frequency	60 Hz
Grounding	In conduit box
Insulation Class	Class F
Inverter Capabilities	NEMA MG1 part 31, UL certified Division 1 for 5:1 constant torque, 10:1 variable torque, T3C, 1.0 Service Factor
Bearing Lubrication/Grease	Non regreasable 143T-210T. Regreasable 250T-449T with Polyurea base grease
Bearing Caps	Cast iron internal all frames
Mounting	Dual drilled for multiple frame mounting
Shaft	1045 carbon steel
Nameplate	Stainless Steel
NEMA Design	NEMA Design B
Enclosure Rating	IP55
Service Factor	1.15 (1.0 SF on VFD)
Temperature Rise	80°C @ 1.0 SF by resistance
Tests	NEMA routine
Time Rating	Continuous
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first
Agency Approval	UL Listed for hazardous locations

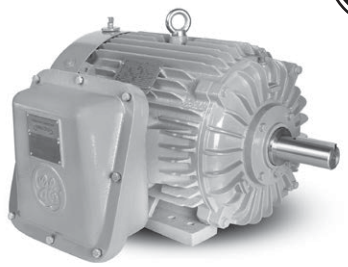
Energy Saver Explosion Proof
Low Voltage



Horizontal Base Mounted
Class I, Groups C and D; Class II, Groups F and G
Volts: 230/460, 460
HP: 1.5 - 250

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
1.5	1800	230/460	145T	**E504**	5KS145CWL221	N	
1.5	1200	230/460	182T	**E505**	5KS182CWL305	N	
2	1200	230/460	184T	**E508**	5KS184CWL305	N	
3	3600	230/460	182T	**E509**	5KS182CWL105	N	
3	1800	230/460	182T	**E510**	5KS182CWL205	N	
3	1200	230/460	213T	**E511**	5KS213CWL305	N	
5	3600	230/460	184T	**E512**	5KS184CWL105	Y	
5	1800	230/460	184T	**E513**	5KS184CWL205	Y	
5	1200	230/460	215T	**E514**	5KS215CWL305	N	
7.5	3600	230/460	213T	**E515**	5KS213CWL105	Y	
7.5	1800	230/460	213T	**E516**	5KS213CWL205	Y	
7.5	1200	230/460	254T	**E517**	5KS254CWL305	N	
10	3600	230/460	215T	**E518**	5KS215CWL105	Y	
10	1800	230/460	215T	**E519**	5KS215CWL205	Y	
10	1200	230/460	256T	**E520**	5KS256CWL305	N	
15	3600	230/460	254T	**E521**	5KS254CWL105	Y	
15	1800	230/460	254T	**E522**	5KS254CWL205	Y	
15	1200	230/460	284T	**E523**	5KS284CWL305	N	
20	3600	230/460	256T	**E524**	5KS256CWL105	Y	
20	1800	230/460	256T	**E525**	5KS256CWL205	Y	
20	1200	230/460	286T	**E526**	5KS286CWL305	N	
25	3600	230/460	284TS	**E527**	5KS284CWL115	Y	
25	1800	230/460	284T	**E528**	5KS284CWL205	Y	
25	1200	230/460	324T	**E529**	5KS324CWL305	N	
30	3600	230/460	286TS	**E530**	5KS286CWL115	Y	
30	1800	230/460	286T	**E531**	5KS286CWL205	Y	
40	3600	230/460	324TS	**E533**	5KS324CWL115	Y	
40	1800	230/460	324T	**E534**	5KS324CWL205	Y	
40	1200	230/460	364T	**E535**	5KS364CWL305	N	
50	3600	230/460	326TS	**E536**	5KS326CWL115	Y	
50	1800	230/460	326T	**E537**	5KS326CWL205	Y	
60	3600	230/460	364TS	**E539**	5KS364CWL115	Y	
60	1800	230/460	364T	**E540**	5KS364CWL205	Y	
60	1200	230/460	404T	**E541**	5KS404CWL305	N	
75	3600	230/460	365TS	**E542**	5KS365CWL115	Y	
75	1800	230/460	365T	**E543**	5KS365CWL205	Y	
75	1200	230/460	405T	**E544**	5KS405CWL305	N	
100	3600	230/460	405TS	**E545**	5KS405CWL115	Y	
100	1800	230/460	405T	**E546**	5KS405CWL205	Y	
100	1200	460	444T	**E547**	5KS444CWL308	N	

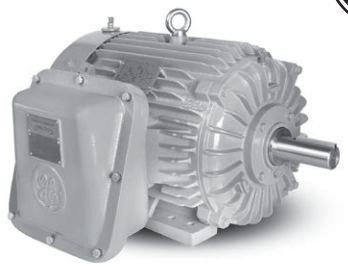
Energy Saver Explosion Proof
Low Voltage



Horizontal Base Mounted
Class I, Groups C and D; Class II, Groups F and G
Volts: 230/460, 460
HP: 1.5 - 250

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
125	3600	460	444TS	**E548**	5KS444CWL118	Y	
125	1800	460	444T	**E549**	5KS444CWL208	Y	
125	1200	460	445T	**E550**	5KS445CWL308	N	
150	3600	460	445TS	**E551**	5KS445CWL118	Y	
150	1800	460	445T	**E552**	5KS445CWL208	Y	
200	3600	460	447TS	**E554**	5KS447CWL118	Y	
200	1800	460	447T	**E555**	5KS447CWL208	Y	
250	3600	460	449TS	**E557**	5KS449CWL118	Y	
250	1800	460	449T	**E558**	5KS449CWL208	Y	

Energy Saver Explosion Proof
Low Voltage



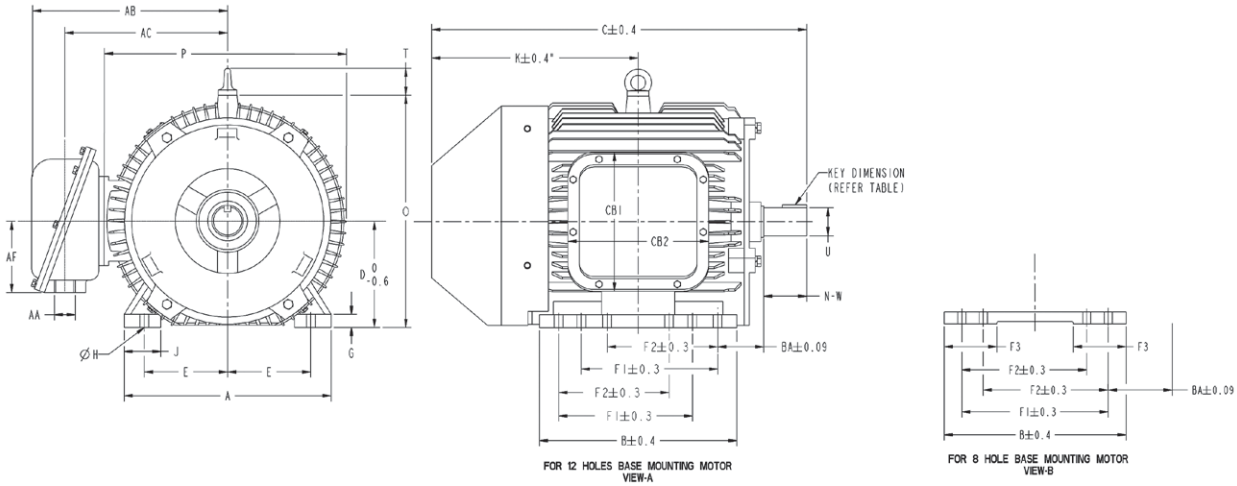
Horizontal Base Mounted C-Face Footed
Division 1, Class I, Groups C and D; Class II, Groups F and G
Volts: 230/460
HP: 5 - 75

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
5	3600	230/460	184TC	**EC512**	5KS184RWL105	Y	
5	1800	230/460	184TC	**EC513**	5KS184RWL205	Y	
7.5	3600	230/460	213TC	**EC515**	5KS213RWL105	Y	
7.5	1800	230/460	213TC	**EC516**	5KS213RWL205	Y	
10	3600	230/460	215TC	**EC518**	5KS215RWL105	Y	
10	1800	230/460	215TC	**EC519**	5KS215RWL205	Y	
15	3600	230/460	254TC	**EC521**	5KS254RWL105	Y	
15	1800	230/460	254TC	**EC522**	5KS254RWL205	Y	
20	3600	230/460	256TC	**EC524**	5KS256RWL105	Y	
20	1800	230/460	256TC	**EC525**	5KS256RWL205	Y	
25	3600	230/460	284TSC	**EC527**	5KS284RWL115	Y	
25	1800	230/460	284TC	**EC528**	5KS284RWL205	Y	
30	3600	230/460	286TSC	**EC530**	5KS286RWL115	Y	
30	1800	230/460	286TC	**EC531**	5KS286RWL205	Y	
40	3600	230/460	324TSC	**EC533**	5KS324RWL115	Y	
40	1800	230/460	324TC	**EC534**	5KS324RWL205	Y	
50	3600	230/460	326TSC	**EC536**	5KS326RWL115	Y	
50	1800	230/460	326TC	**EC537**	5KS326RWL205	Y	
60	3600	230/460	364TSC	**EC539**	5KS364RWL115	Y	
60	1800	230/460	364TC	**EC540**	5KS364RWL205	Y	
75	3600	230/460	365TSC	**EC542**	5KS365RWL115	Y	
75	1800	230/460	365TC	**EC543**	5KS365RWL205	Y	

Energy Saver Explosion Proof

Low Voltage

Dimensions



Frame	Poles	Dimensions in Inches															
		Key SQ	Key LG	A	B	C	D	E	F1	F2	F3	G	H	J	K	O	P
143T/145T	2, 4, 6	0.188	1.456	6.92	8.15	15.40	3.50	2.75	5.00	4.00	NA	0.47	Dia 0.34	1.42	7.42	7.83	8.30
182T/184T	2, 4, 6	0.250	1.770	8.86	8.97	18.43	4.50	3.75	5.50	4.50	NA	0.68	Dia 0.41	1.69	8.97	10.01	10.63
213T/215T	2, 4, 6	0.312	2.440	10.43	10.07	21.85	5.25	4.25	7.00	5.50	NA	0.87	Dia 0.41	2.17	10.27	11.43	12.56
254T/256T	2, 4, 6	0.375	2.910	12.36	12.40	24.95	6.25	5.00	10.00	8.25	3.74	0.87	Dia 0.53	2.75	11.69	13.30	14.47
284T/286T	4, 6	0.500	3.307	13.74	13.74	28.42	7.00	5.50	11.00	9.50	4.30	0.87	Dia 0.53	2.76	13.56	15.40	16.24
284TS/286TS	2	0.375	1.929	13.74	13.74	27.05	7.00	5.50	11.00	9.50	4.30	0.87	Dia 0.53	2.76	13.56	15.40	16.24
324T/326T	4, 6	0.500	3.940	15.55	15.00	31.75	8.00	6.25	12.00	10.50	4.30	0.98	Dia 0.66	2.76	15.25	17.45	18.34
324TS/326TS	2	0.500	2.050	15.55	15.00	30.25	8.00	6.25	12.00	10.50	4.30	0.98	Dia 0.66	2.76	15.25	17.45	18.34
364T	4, 6	0.625	4.290	17.10	15.50	32.50	9.00	7.00	NA	11.25	3.54	0.98	Dia 0.66	2.95	16.52	18.97	20.30
365T	4, 6	0.625	4.290	17.10	15.50	36.40	9.00	7.00	NA	12.25	5.31	0.98	Dia 0.66	2.95	17.40	18.97	20.27
364TS	2	0.500	2.050	17.10	15.50	30.37	9.00	7.00	NA	11.25	3.54	0.98	Dia 0.66	2.95	16.52	18.97	20.30
365TS	2	0.500	2.050	17.10	17.24	34.27	9.00	7.00	NA	12.25	5.31	0.98	Dia 0.66	2.95	17.40	18.97	20.27
404T/405T	4, 6	0.750	5.710	19.05	17.05	38.20	10.00	8.00	13.74	12.25	4.72	1.18	Dia 0.81	3.15	17.48	21.50	22.71
405TS	2	0.500	2.830	19.05	17.05	35.20	10.00	8.00	13.74	12.25	4.72	1.18	Dia 0.81	3.15	17.48	21.50	22.71
444T/445T	4, 6	0.875	6.930	21.30	22.05	46.15	11.00	9.00	16.50	14.50	6.30	1.38	Dia 0.81	3.74	21.90	23.64	25.20
444TS/445TS	2	0.625	3.030	21.30	22.05	42.40	11.00	9.00	16.50	14.50	6.30	1.38	Dia 0.81	3.74	21.90	23.64	25.20
447T/449T	4, 6	0.875	6.930	21.30	30.55	55.06	11.00	9.00	25.00	20.00	8.66	1.38	Dia 0.81	3.74	26.56	23.65	25.12
447TS/449TS	2	0.625	3.030	21.30	30.55	51.31	11.00	9.00	25.00	20.00	8.66	1.38	Dia 0.81	3.74	26.56	23.65	25.12

Frame	Poles	Dimensions in Inches									
		T	U	AA	AB	AC	AF	CB1	CB2	BA	N-W
143T/145T	2, 4, 6	1.91	0.875	3/4-14 NPT	8.22	6.42	3.24	6.49	6.30	2.25	2.25
182T/184T	2, 4, 6	1.91	1.125	3/4-14 NPT	9.41	7.56	3.26	6.49	6.30	2.75	2.75
213T/215T	2, 4, 6	2.22	1.375	1-11.5 NPT	11.38	8.81	3.84	7.67	7.60	3.50	3.38
254T/256T	2, 4, 6	2.07	1.625	1-1/4 NPT	13.38	10.43	5.51	11.02	10.63	4.25	4.00
284T/286T	4, 6	2.07	1.875	1-1/2 NPT	14.17	11.20	5.51	11.02	10.60	4.75	4.63
284TS/286TS	2	2.07	1.625	1-1/2 NPT	14.17	11.20	5.51	11.02	10.60	4.75	3.25
324T/326T	4, 6	2.44	2.125	2-8 NPT	15.20	11.85	5.51	11.02	10.63	5.25	5.25
324TS/326TS	2	2.44	1.875	2-8 NPT	15.20	11.85	5.51	11.02	10.63	5.25	3.75
364T	4, 6	2.44	2.375	3-8 NPT	17.13	14.06	6.45	13.78	12.60	5.88	5.88
365T	4, 6	2.44	2.375	3-8 NPT	17.10	14.06	6.45	13.78	12.60	5.88	5.88
364TS	2	2.44	1.875	3-8 NPT	17.13	14.06	6.45	13.78	12.60	5.88	3.75
365TS	2	2.44	1.875	3-8 NPT	17.10	14.06	6.45	13.78	12.60	5.88	3.75
404T/405T	4, 6	4.19	2.875	3-8 NPT	18.70	15.55	6.45	15.74	12.60	6.62	7.25
405TS	2	4.19	2.125	3-8 NPT	18.70	15.55	6.45	15.74	12.60	6.62	4.25
444T/445T	4, 6	4.81	3.375	3-8 NPT	21.26	16.85	7.89	15.74	15.55	7.50	8.50
444TS/445TS	2	4.81	2.375	3-8 NPT	21.26	16.85	7.89	15.74	15.55	7.50	4.75
447T/449T	4, 6	4.81	3.375	3-8 NPT	21.26	16.85	7.89	15.74	15.55	7.50	8.50
447TS/449TS	2	4.81	2.375	3-8 NPT	21.26	16.85	7.89	15.74	15.55	7.50	4.75

Notes

VP
Vertical Pump Motors

VP.3 Ultra™ and Ultra+™ Vertical Hollow Shaft - WPI
VP.3 Standard Features
VP.4 Ultra Pricing
VP.11 Ultra+ Pricing

VP.15 Fire Pump Duty Motors
VP.15 Standard Features
VP.16 EPACT Efficient and Premium Efficient Pricing

VP.19 Ultra™, Ultra+™ and Fire Pump Dimensions 213-5813 Frame

VP.21 Ultra™, Ultra+™ and Fire Pump Coupling Kit Pricing and Dimensions

VP.23 Ultra™ and Ultra+™ Stabilizer Bushing Pricing and Dimensions

VP.24 Ultra™ and Ultra+™ P-Base Kits

VP.25 Ultra™ TEFC Vertical Hollow Shaft
VP.25 Standard Features
VP.26 Pricing
VP.29 Dimensions 213-5013 Frame
VP.31 Coupling Kit Pricing and Dimensions
VP.32 P-Base Kits

VP.33 Ultra™ TEFC VSS NT
VP.33 Standard Features
VP.34 Pricing - Normal Thrust
VP.35 Dimensions 182-449 Frame

VP.36 Ultra+™ Vertical Solid Shaft High Thrust (WPI)
VP.36 Standard Features
VP.37 Pricing

VP.39 Ultra™ TEFC Vertical Solid Shaft High Thrust
VP.39 Standard Features
VP.40 Pricing

VP.42 XSD Ultra® 841 VSS TEFC
VP.42 Standard Features
VP.43 Pricing - Inline Pump
VP.45 Pricing - High Thrust
VP.47 Dimensions 182-449 Frame
VP.48 P-Base Kits

VP.49 XSD Ultra® 841 Vertical C-Face NT
VP.49 Standard Features
VP.50 Pricing
VP.51 Dimensions



WOLONG

Power your future



Ultra Vertical Pump Motors

The ultimate install and forget pump motor.

5-1750 HP
460, 575, 2300/4160 V
60Hz / 50Hz
WPI / TEFC Enclosures
182-5013 Frames
Hollow and Solid Shaft
Extra High Thrusts

Ultra Series vertical pump motors combine all the benefits of rugged and reliable XSD Ultra materials with advanced thrust and cooling technologies. All ratings of the Ultra family are fully inverter-duty exceeding NEMA MG1-31 requirements. Ultra Series vertical pump motors are completely NEMA premium efficient, meeting IEEE 841 levels with a full cast iron frame, inline, high thrust, space heaters, and a non-reverse ratchet.

www.emporiumve.com

Ultra™ and Ultra+™ Vertical Hollow Shaft

Weather Protection I (WPI)
Premium Efficient

Standard Features



Type	Ultra™ WPI VHS	Ultra+™ WPI VHS with bearing fluting protection	Key Differences
HP Range	3 - 1750	10 - 1750	
Poles	2, 4, 6	2, 4, 6	
Voltage	200-230/460, 230/460, 460, 460 PWS, 460/575, 575, 2300, 2300/4000, 4160	230/460, 460, 460 PWS, 575, 2300/4000	
Efficiency	NEMA Premium	NEMA Premium	
Frequency	60 Hz (De-rated at 50 Hz and noted on the nameplate.)	60 Hz (De-rated at 50 Hz and noted on the nameplate.)	
NEMA Design	B	B (select marked ratings are A)	
Agency Approvals	UL - Component and Insulation System Recognition, CSA - Motors	UL - Component and Insulation System Recognition, CSA - Motors	
Altitude	3300 ft	3300 ft	
Ambient	40ºC	40ºC	
Balance/Vibration	Special Balance = 0.075 IPS	Special Balance = 0.075 IPS	
Bearing Caps	Yes	Yes	
Bearing Protection	Shaft Slinger	Shaft Slinger	
Bearing Type	High Thrust and Extra High Thrust	High Thrust and Extra High Thrust	
Conduit Box	Cast Iron	Cast Iron	
Coupling	Non-Reverse Standard, kitted for Self Release, or Bolted	Non-Reverse Standard, kitted for Self Release, or Bolted	
End Shield	Cast Iron	Cast Iron	
Fasteners	SAE	SAE	
Frame Material	Cast Iron	Cast Iron	
Frame Size	213-5011	213-5813	
Grease/Oil	All Guide and 213-286 Thrust Bearings: Polyrex EM, 324-449 Oil Lubricated Thrust Bearings: ISO 32, 64, 150 depending upon bearing type	All Guide and 213-286 Thrust Bearings: Polyrex EM, 324-509 Oil Lubricated Thrust Bearings: ISO 32, 64, 150 depending upon bearing type	
Ground	Brass Bolt on Frame and in Conduit Box	Brass Bolt on Frame and in Conduit Box	
Insulation Class	H	H	
Insulation System	GEGARD2400, Non-Hygroscopic, Anti-Fungus, 2400 Volt at .1 microsecond rise time, Exceeds NEMA MG1-31 for variable frequency drives	GEGARD2400, Non-Hygroscopic, Anti-Fungus, 2400 Volt at .1 microsecond rise time, Exceeds NEMA MG1-31 for variable frequency drives	
Inverter Capabilities	Variable Torque 5-60 Hz	Variable Torque 5-60 Hz	
Lifting Means	Yes, Integral to Endshield	Yes, Integral to Endshield	
Mounting	Vertical P-Base	Vertical P-Base	
Nameplate	Stainless Steel	Stainless Steel	
Non-Reverse Ratchet Type	Ball Style	Ball Style	
Paint	Grey Epoxyester	Grey Epoxyester	
Relubrication	Yes	Yes	
Rotor	Cast Aluminum	Cast Aluminum	
Service Factor	1.15	1.15	
Shaft Grounding	N/A	10-100HP: Aegis SGR on DE, 125HP and up: Aegis SGR on DE and Insulated Bearing Carrier on ODE	*
Space Heater	115 Volt, 60 Hz	115 Volt, 60 Hz	
Temperature Rise	80ºC @ 1.0 SF	80ºC @ 1.0 SF	
Tests	NEMA Routine only	NEMA Routine only	
Thermostats	N/A	Includes NC Winding Thermostats	*
Time Rating	Continuous	Continuous	
Top Hat	Cast Aluminum	Cast Aluminum	
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first	36 months from date of installation or 42 months from date of manufacture, whichever occurs first	

Ultra™ Vertical Hollow Shaft

Inverter Duty
Weather Protection I (WPI)
Premium Efficient



Notes 113 and 114 indicate Ultra+ with bearing fluting protection

HP: 3 - 1750

HP	RPM	Volts	Frame	Thrust Down	Cat. No.	Model No.	Motor Coupling BX	Motor Coupling Key	Normally Stocked	Notes
3	1200	230/460	L213TP10	2,377	**V4619**	5KS213DAE7021	1.000	0.250	N	
5	3600	230/460	L213TP10	1,900	**V4000**	5KS213DAE5045	1.000	0.250	N	111
5	1800	230/460	L213TP10	2,071	**V4008**	5KS213DAE6064	1.000	0.250	Y	111
7.5	3600	230/460	L213TP10	1,900	**V4001**	5KS213DAE5043	1.000	0.250	N	111
7.5	1800	230/460	L213TP10	2,071	**V4009**	5KS213DAE6065	1.000	0.250	Y	111
10	3600	230/460	L213TP10	1,900	**V4002**	5KS213DAE5044	1.000	0.250	N	111
10	1800	230/460	L215TP10	2,071	**V4010**	5KS215DAE6039	1.000	0.250	Y	111
10	1200	230/460	L256TP12	3,379	**V4019**	5KS256DAE7023	1.000	0.250	N	111
15	3600	230/460	L215TP10	1,850	**V4003**	5KS215DAE5038	1.000	0.250	N	111
15	1800	230/460	L254TP10	2,575	**V4011**	5KS254DAE6049	1.000	0.250	Y	111
15	1800	230/460	L254TP10	2,575	**V4035**	5KS254DAE6055	1.250	0.250	N	111
15	1800	230/460	L254TP12	2,575	**V4074**	5KS254DAE6061	1.188	0.250	N	111
15	1800	230/460	L254TP16	2,575	**V4012**	5KS254DAE6050	1.000	0.250	Y	111
15	1800	230/460	L254TP16	2,575	**V4075**	5KS254DAE6062	1.188	0.250	N	111
15	1800	230/460	L254TP16	2,575	**V4036**	5KS254DAE6054	1.250	0.250	N	111
15	1200	230/460	L284TP12	3,379	**V4020**	5KS284DAE7026	1.000	0.250	N	111, 166
20	3600	230/460	L254TP10	2,600	**V4004**	5KS256DAE5035	1.000	0.250	N	111
20	3600	230/460	L254TP12	2,600	**V4033**	5KS256DAE5039	1.000	0.250	N	111
20	1800	230/460	L256TP12	2,575	**V4013**	5KS256DAE6065	1.000	0.250	Y	111
20	1800	230/460	L256TP12	2,575	**V4076**	5KS256DAE6091	1.188	0.250	N	111
20	1800	230/460	L256TP12	2,575	**V4037**	5KS256DAE6075	1.250	0.250	N	111
20	1800	230/460	L256TP16	2,575	**V4014**	5KS256DAE6066	1.000	0.250	Y	111
20	1800	230/460	L256TP16	2,575	**V4077**	5KS256DAE6092	1.188	0.250	N	111
20	1800	230/460	L256TP16	2,575	**V4038**	5KS256DAE6076	1.250	0.250	N	111
20	1200	230/460	L286TP12	3,379	**V4021**	5KS286DAE7028	1.000	0.250	N	111, 166
20	900	230/460	L324TP16	8,046	**V4067**	5KS324DAJ8005	1.188	0.250	N	111
25	3600	230/460	L256TP12	2,600	**V4005**	5KS256DAE5036	1.000	0.250	N	111, 166
25	3600	230/460	L256TP12	2,600	**V4062**	5KS256DAE5042	1.188	0.250	N	111,166
25	1800	230/460	L284TP12	2,960	**V4015**	5KS284DAE6061	1.000	0.250	Y	111, 166
25	1800	230/460	L284TP12	2,960	**V4063**	5KS284DAE6074	1.188	0.250	N	111,166
25	1800	230/460	L284TP16	2,960	**V4016**	5KS284DAE6062	1.000	0.250	Y	111, 166
25	1800	230/460	L284TP16	2,960	**V4070**	5KS284DAE6087	1.188	0.250	N	111, 166
25	1800	230/460	L284TP16	2,960	**V4039**	5KS284DAE6071	1.250	0.250	N	111, 166
25	1200	230/460	L324TP16	6,700	**V4603**	5KS324DAJ7005	1.000	0.250	N	111
25	900	460	L326TP16	8,047	**V4064**	5KS326DAJ8026	1.000	0.250	N	110

Notes:
110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
111 Usable on 190/380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
166 137 cubic inch conduit box

Ultra™ Vertical Hollow Shaft

Inverter Duty
Weather Protection I (WPI)
Premium Efficient



Notes 113 and 114 indicate Ultra+ with bearing fluting protection

HP: 3 - 1750

HP	RPM	Volts	Frame	Thrust Down	Cat. No.	Motor Model No.	Coupling BX	Coupling Key	Normally Stocked	Notes
30	3600	230/460	L284TP12	2,600	**V4006**	5KS284DAE5038	1.000	0.250	N	111, 166
30	3600	230/460	L284TP12	2,600	**V4055**	5KS284DAE5040	1.250	0.250	N	111, 166
30	1800	230/460	L286TP12	2,960	**V4017**	5KS286DAE6059	1.000	0.250	Y	111, 166
30	1800	230/460	L286TP12	2,960	**V4071**	5KS286DAE6106	1.188	0.250	N	111, 166
30	1800	230/460	L286TP16	2,960	**V4018**	5KS286DAE6060	1.000	0.250	Y	111, 166
30	1800	230/460	L286TP16	2,960	**V4072**	5KS286DAE6107	1.188	0.250	N	111, 166
30	1800	200-230/460	L286TP16	2,960	**V4034**	5KS286DAE6072	1.250	0.250	N	111, 166
30	1200	230/460	L326TP16	6,700	**V4073**	5KS326DAJ7024	1.188	0.250	N	111
30	1200	230/460	L326TP16	6,700	**V4604**	5KS326DAJ7005	1.250	0.375	N	111
40	3600	230/460	L286TP12	2,500	**V4007**	5KS286DAE5040	1.000	0.250	N	111, 167
40	3600	230/460	L286TP12	2,500	**V4069**	5KS286DAE5043	1.250	0.250	N	111, 167
40	3600	230/460	L286TP16	2,500	**V4061**	5KS286DAE5041	1.000	0.250	N	111, 167
40	1800	200-230/460	L324TP12	6,320	**V4455**	5KS324DAJ6055	1.188	0.250	N	111, 117
40	1800	230/460	L324TP12	6,324	**V4412**	5KS324DAJ6020	1.250	0.250	Y	111, 117
40	1800	200-230/460	L324TP12	6,320	**V4456**	5KS324DAJ6056	1.500	0.375	N	111, 117
40	1800	200-230/460	L324TP16	6,320	**V4060**	5KS324DAJ6074	1.000	0.250	N	111, 117
40	1800	200-230/460	L324TP16	6,320	**V4457**	5KS324DAJ6057	1.188	0.250	N	111, 117
40	1800	230/460	L324TP16	6,324	**V4413**	5KS324DAJ6005	1.250	0.250	N	111
40	1800	200-230/460	L324TP16	6,320	**V4458**	5KS324DAJ6058	1.500	0.375	N	111, 117
40	1800	460 PWS	L324TP16	6,324	**V4414**	5KS324DAJ6008	1.250	0.250	Y	110
40	1800	460 PWS	L324TP16	6,320	**V4043**	5KS324DAJ6066	1.500	0.375	N	110, 117
40	1800	575	L324TP16	6,320	**V4056**	5KS324DAJ6071	1.500	0.375	N	117
40	1200	230/460	L364TP16	6,700	**V4605**	5KS364DAJ7005	1.250	0.375	Y	111, 116, 167
50	3600	230/460	L324TP12	6,300	**V4209**	5KS324DAJ5020	1.000	0.250	N	111
50	3600	230/460	L324TP16	6,300	**V4210**	5KS324DAJ5005	1.000	0.250	N	111
50	1800	200-230/460	L326TP12	6,320	**V4459**	5KS326DAJ6061	1.188	0.250	N	111, 117
50	1800	230/460	L326TP12	6,324	**V4079**	5KS326DAJ6087	1.000	0.250	N	111, 117
50	1800	230/460	L326TP12	6,324	**V4453**	5KS326DAJ6054	1.250	0.250	N	111, 117
50	1800	200-230/460	L326TP12	6,320	**V4460**	5KS326DAJ6062	1.500	0.375	N	111, 117

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
111 Usable on 190/380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
116 Maximum BX diameter is 1.5 inches.
117 Also certified for UL Fire Pump Usage
166 137 cubic inch conduit box
167 346 cubic inch conduit box

Ultra™ Vertical Hollow Shaft

Inverter Duty
Weather Protection I (WPI)
Premium Efficient



Notes 113 and 114 indicate Ultra+ with bearing fluting protection

HP: 3 - 1750

HP	RPM	Volts	Frame	Thrust Down	Cat. No.	Motor Model No.	Coupling BX	Coupling Key	Normally Stocked	Notes
50	1800	200-230/460	L326TP16	6,320	**V4461**	5KS326DAJ6063	1.188	0.250	N	111, 117
50	1800	230/460	L326TP16	6,324	**V4415**	5KS326DAJ6005	1.250	0.250	N	111, 117
50	1800	200-230/460	L326TP16	6,320	**V4462**	5KS326DAJ6064	1.500	0.375	N	111, 117
50	1800	460 PWS	L326TP16	6,324	**V4416**	5KS326DAJ6008	1.250	0.250	Y	110, 117
50	1800	460 PWS	L326TP16	6,320	**V4041**	5KS326DAJ6069	1.500	0.375	N	110, 117
50	1200	230/460	L365TP16	6,700	**V4606**	5KS365DAJ7005	1.250	0.375	N	111, 116, 167
60	3600	460 PWS	L326TP16	6,300	**V4211**	5KS326DAJ5008	1.250	0.250	N	110
60	1800	200-230/460	L364TP12	6,244	**V4463**	5KS364DAJ6052	1.188	0.250	N	111, 117, 163
60	1800	200-230/460	L364TP12	6,244	**V4464**	5KS364DAJ6053	1.500	0.375	N	111, 117, 163
60	1800	200-230/460	L364TP16	6,244	**V4465**	5KS364DAJ6054	1.188	0.250	N	111, 117, 163
60	1800	230/460	L364TP16	6,244	**V4417**	5KS364DAJ6005	1.250	0.250	N	111, 116, 117, 167
60	1800	200-230/460	L364TP16	6,244	**V4466**	5KS364DAJ6055	1.500	0.375	N	111, 117, 163
60	1800	460 PWS	L364TP16	6,244	**V4418**	5KS364DAJ6008	1.250	0.250	Y	110, 116, 167
60	1800	575	L364TP16	6,244	**V4496**	5KS364DAJ6058	1.188	0.250	N	117, 167
60	1200	460 PWS	L404TP16	7,800	**V4607**	5KS404DAJ7008	1.500	0.375	N	110
75	3600	460 PWS	L364TP16	6,500	**V4212**	5KS364DAJ5008	1.250	0.250	N	110, 116, 167
75	1800	200-230/460	L365TP12	6,244	**V4467**	5KS365DAJ6076	1.188	0.250	N	111, 117, 163
75	1800	200-230/460	L365TP12	6,244	**V4468**	5KS365DAJ6077	1.500	0.375	N	111, 117, 163
75	1800	200-230/460	L365TP16	6,244	**V4469**	5KS365DAJ6078	1.188	0.250	N	111, 117, 163
75	1800	230/460	L365TP16	6,244	**V4419**	5KS365DAJ6005	1.250	0.250	N	111, 116, 117, 163
75	1800	200-230/460	L365TP16	6,244	**V4470**	5KS365DAJ6079	1.500	0.375	N	111, 117, 163
75	1800	230/460	L365TP16	12,009	**V4066**	5KS365DAJ6074	1.500	0.250	N	116, 163
75	1800	230/460	L365TP16	12,009	**V4068**	5KS365DAJ6097	1.438	0.375	N	116, 163
75	1800	460 PWS	L365TP16	6,244	**V4420**	5KS365DAJ6008	1.250	0.250	Y	110, 116, 167
75	1800	460 PWS	L365TP16	6,244	**V4040**	5KS365DAJ6085	1.500	0.375	N	110, 116, 117, 167
75	1200	460 PWS	L405TP16	16,516	**V4516**	5KS405DAJ7031	1.250	0.250	N	110, 113
75	1200	460 PWS	L405TP16	7,800	**V4608**	5KS405DAJ7008	1.500	0.375	N	110
75	900	230/460	L444TP16	17,831	**V4059**	5KS444DAJ8022	1.500	0.375	N	163

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
111 Usable on 190/380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
113 Aegis Shaft Grouding ring on bearing cap (40-100HP)
116 Maximum BX diameter is 1.5 inches.
117 Also certified for UL Fire Pump Usage
163 700 cubic inch conduit box
167 346 cubic inch conduit box

Ultra™ Vertical Hollow Shaft

Inverter Duty
Weather Protection I (WPI)
Premium Efficient



Notes 113 and 114 indicate Ultra+ with bearing fluting protection

HP: 3 - 1750

HP	RPM	Volts	Frame	Thrust Down	Motor Cat. No.	Model No.	Coupling BX	Coupling Key	Normally Stocked	Notes
100	1800	200-230/460	L404TP16	7,539	**V4471**	5KS404DAJ6062	1.188	0.250	N	111, 117
100	1800	200-230/460	L404TP16	7,539	**V4472**	5KS404DAJ6063	1.500	0.375	N	111, 117
100	1800	200-230/460	L404TP16	7,539	**V4473**	5KS404DAJ6064	1.688	0.375	N	111, 117
100	1800	230/460	L404TP16	14,609	**V4422**	5KS404DAJ6005	1.500	0.375	N	111
100	1800	460 PWS	L404TP16	7,539	**V4421**	5KS404DAJ6008	1.500	0.375	Y	110, 117
100	1800	460 PWS	L404TP16	14,609	**V4423**	5KS404DAJ6022	1.500	0.375	Y	110
100	1800	460/575	L404TP16	7,539	**V4053**	5KS404DAJ6075	1.500	0.375	N	110, 117
100	1800	460/575	L404TP16	7,539	**V4054**	5KS404DAJ6076	1.688	0.375	N	110, 117
100	1200	460 PWS	L444TP16	16,082	**V4618**	5KS444DAJ7046	1.500	0.375	N	110, 163
100	1200	460 PWS	L444TP16	16,000	**V4609**	5KS444DAJ7008	1.688	0.375	N	110, 163
100	1200	460 PWS	L444TP20	16,000	**V4611**	5KS444DAJ7039	1.500	0.375	N	110, 163
100	900	460	L445TP24	17,830	**V4852**	5KS445DAJ8039	2.188	0.500	N	163
125	1800	460/575	L405TP16	7,539	**V4474**	5KS405DAJ6057	1.188	0.250	N	110, 117
125	1800	460 PWS	L405TP16	7,539	**V4424**	5KS405DAJ6008	1.500	0.375	Y	110, 117
125	1800	460/575	L405TP16	7,539	**V4475**	5KS405DAJ6058	1.500	0.375	N	110, 117
125	1800	460 PWS	L405TP16	14,609	**V4425**	5KS405DAJ6022	1.500	0.375	Y	110
125	1800	460/575	L405TP16	7,539	**V4476**	5KS405DAJ6059	1.688	0.375	N	110, 117
125	1800	460 PWS	L405TP20	14,609	**V4065**	5KS405DAJ6066	1.188	0.250	N	110, 117
125	1200	460 PWS	L445TP16	24,668	**V4449**	5KS445DAJ7051	1.688	0.375	N	163
125	1200	460	L445TP16	16,083	**V4612**	5KS445DAJ7050	1.938	0.500	N	163
125	1200	460 PWS	L445TP20	24,668	**V4445**	5KS445DAJ7053	1.688	0.375	N	163
125	720	460 PWS	L445TP20	18,417	**V4452**	5KS445DAJ508	2.188	0.500	N	110, 117
150	1800	460 PWS	L444TP16	14,462	**V4426**	5KS444DAJ6008	1.688	0.375	Y	110, 117, 163
150	1800	460 PWS	L444TP16	22,551	**V4444**	5KS444DAJ6074	1.688	0.375	Y	110, 163
150	1800	460/575	L444TP20	14,462	**V4477**	5KS444DAJ6092	1.500	0.375	N	110, 117, 163
150	1800	460 PWS	L444TP20	14,462	**V3666**	5KS444DAJ6037	1.688	0.375	N	110, 163
150	1800	460/575	L444TP20	14,462	**V4478**	5KS444DAJ6093	1.688	0.375	N	110, 117, 163
150	1800	460/575	L444TP20	14,462	**V4479**	5KS444DAJ6094	1.938	0.500	N	110, 117, 163
150	1200	460 PWS	L445TP16	25,024	**V4450**	5KS445DAJ7054	1.688	0.375	N	163
150	1200	460 PWS	L445TP20	25,024	**V4446**	5KS445DAJ7052	1.688	0.375	N	163

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
111 Usable on 190/380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
117 Also certified for UL Fire Pump Usage
163 700 cubic inch conduit box
164 1260 cubic inch conduit box

Ultra™ Vertical Hollow Shaft

Inverter Duty
Weather Protection I (WPI)
Premium Efficient



Notes 113 and 114 indicate Ultra+ with bearing fluting protection

HP: 3 - 1750

HP	RPM	Volts	Frame	Thrust Down	Cat. No.	Model No.	Motor Coupling BX	Motor Coupling Key	Normally Stocked	Notes
200	1800	460 PWS	L444TP16	22,551	**V4427**	5KS444DAJ6020	1.688	0.375	Y	110, 117, 163
200	1800	460/575	L444TP20	14,462	**V4480**	5KS444DAJ6095	1.500	0.375	N	110, 117, 163
200	1800	460/575	L444TP20	14,462	**V4481**	5KS444DAJ6096	1.688	0.375	N	110, 117, 163
200	1800	460 PWS	L444TP20	22,551	**V4428**	5KS444DAJ6025	1.688	0.375	Y	110, 163
200	1800	460/575	L444TP20	14,462	**V4482**	5KS444DAJ6097	1.938	0.500	N	110, 117, 163
200	1200	460 PWS	L447TP20	22,551	**V4451**	5KS447DAJ7038	1.688	0.375	N	163
250	1800	460/575	L445TP20	14,462	**V4483**	5KS445DAJ6087	1.500	0.375	N	110, 117, 164
250	1800	460/575	L445TP20	14,462	**V4484**	5KS445DAJ6088	1.688	0.375	N	110, 117, 164
250	1800	460 PWS	L445TP20	22,551	**V4429**	5KS445DAJ6008	1.688	0.375	Y	110, 117, 164
250	1800	460/575	L445TP20	14,462	**V4485**	5KS445DAJ6089	1.938	0.500	N	110, 117, 164
250	1800	460 PWS	L445TP24	22,551	**V4454**	5KS445DAJ6086	1.688	0.375	N	110, 117, 164
250	1200	460 PWS	L447TP20	24,668	**V4447**	5KS447DAJ7039	1.938	0.500	N	164
250	900	2300	B509TP30	10,700	**V4617**	5KS509DAJ8026	2.438	0.625	N	163
300	1800	460/575	L447TP20	14,188	**V4486**	5KS447DAJ6062	1.688	0.375	N	110, 117, 164
300	1800	460 PWS	L447TP20	22,277	**V4430**	5KS447DAJ6008	1.688	0.375	Y	110, 117, 164
300	1800	460/575	L447TP20	14,188	**V4487**	5KS447DAJ6063	1.938	0.500	N	110, 117, 164
300	1800	460/575	L447TP20	14,188	**V4488**	5KS447DAJ6064	2.188	0.500	N	110, 117, 164
300	1800	2300	L449TP20	22,277	**V4615**	5KS449DAJ6109	1.938	0.500	N	163
300	1200	460 PWS	L449TP20	24,668	**V4448**	5KS449DAJ7039	1.938	0.500	N	164
350	1800	460/575	L447TP20	14,188	**V4489**	5KS447DAJ6065	1.688	0.375	N	110, 117, 164
350	1800	460 PWS	L447TP20	22,277	**V4431**	5KS447DAJ6020	1.688	0.375	Y	110, 117, 164
350	1800	460/575	L447TP20	14,188	**V4490**	5KS447DAJ6066	1.938	0.500	N	110, 117, 164
350	1800	460/575	L447TP20	14,188	**V4491**	5KS447DAJ6067	2.188	0.500	N	110, 117, 164
350	1800	460/575	L447TP20	14,188	**V4492**	5KS447DAJ6068	2.375	0.625	N	110, 117, 164
400	1800	460/575	L449TP20	14,188	**V4493**	5KS449DAJ6095	1.938	0.500	N	110, 117, 165
400	1800	460/575	L449TP20	14,188	**V4494**	5KS449DAJ6096	2.188	0.500	N	110, 117, 165
400	1800	460/575	L449TP20	14,188	**V4495**	5KS449DAJ6097	2.375	0.625	N	110, 117, 165

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap
117 Also certified for UL Fire Pump Usage
132 Includes NC Winding Thermostats
156 With Spherical Roller Bearing water cooling required
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
168 2500 cubic inch conduit box 2-3" NPT
176 Formed Coil Epoxy VPI
194 Has 100 ohm winding and bearing RTDs

Ultra™ Vertical Hollow Shaft

Inverter Duty
Weather Protection I (WPI)
Premium Efficient



Notes 113 and 114 indicate Ultra+ with bearing fluting protection

HP: 3 - 1750

HP	RPM	Volts	Frame	Thrust Down	Cat. No.	Model No.	Motor Coupling BX	Motor Coupling Key	Normally Stocked	Notes
400	1800	460 PWS	L449TP20	20,800	**V4432**	5KS449DAJ6008	1.938	0.500	Y	110, 117, 165
400	1800	460 PWS	L449TP20	30,000	**V4433**	5KS449DAJ6022	1.938	0.500	N	110, 165
400	1800	2300	B509TP24	8,100	**V4499**	5KS509DAJ6048	2.188	0.500	N	163
400	1800	4160	B509TP30	27,484	**V4563**	5KS509DAJ6058	1.938	0.500	N	114, 165, 176, 194
450	1800	460 PWS	L449TP20	30,000	**V4534**	5KS449DAJ6020	1.938	0.500	N	110, 114, 132, 165
450	900	4160	B5011TP24	17,650	**V4614**	5KS511DAJ8024	2.438	0.625	N	165
500	1800	460	B509TP20	31,604	**V959**	5KS509DAJ6028	2.188	0.500	N	110, 114, 132, 168, 176
500	1800	460 PWS	B509TP24	27,484	**V921**	5KS509DAJ6069	2.188	0.500	Y	110, 114, 132, 165, 176
500	1800	460 PWS	B509TP24	45,304	**V922**	5KS509DAJ6071	2.188	0.500	N	110, 114, 132, 156, 165, 176
500	1800	2300	B509TP20	13,984	**V979**	5KS509DAJ6055	2.188	0.500	N	114, 194
600	1800	460 PWS	B511TP24	26,976	**V923**	5KS511DAJ6041	2.188	0.500	Y	110, 114, 132, 176
600	1800	460 PWS	B511TP30	26,976	**V924**	5KS511DAJ6039	2.188	0.500	N	110, 114, 132, 176
600	1800	460 PWS	B511TP24	44,796	**V925**	5KS511DAJ6042	2.188	0.500	N	110, 114, 132, 156, 169, 176
600	1800	460 PWS	B5013TP24	44,796	**V4564**	5KS513DAJ6046	2.188	0.500	Y	110, 114, 132, 156, 169, 176, 200
700	1800	460	B513TP24	26,976	**V920**	5KS513DAJ6038	2.188	0.500	N	114, 132, 169, 176
700	1800	460 PWS	B5013TP24	44,796	**V4564**	5KS513DAJ6046	2.188	0.500	Y	110, 114, 132, 156, 169, 176, 200
800	1800	460 PWS	B5013TP24	44,796	**V4564**	5KS513DAJ6046	2.188	0.500	Y	110, 114, 132, 156, 169, 176, 200
800	1800	460 PWS	B513TP30	44,796	**V928**	5KS513DAJ6042	2.188	0.500	N	114, 132, 156, 169, 176
900	1800	2300/4000	B513TP24	44,796	**V976**	5KS513DAJ6029	2.188	0.500	N	114, 132, 156, 165
900	1800	2300/4000	B513TP30	44,796	**V977**	5KS513DAJ6030	2.188	0.500	N	114, 132, 156, 165

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap
117 Also certified for UL Fire Pump Usage
132 Includes NC Winding Thermostats
156 With Spherical Roller Bearing water cooling required
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
168 2500 cubic inch conduit box 2-3" NPT
169 5700 cubic inch conduit box
176 Formed Coil Epoxy VPI
194 Has 100 ohm winding and bearing RTDs
200 600/700/800HP tri-rated model. Extra nameplates will be supplied in conduit box.

Ultra™ Vertical Hollow Shaft

Inverter Duty
Weather Protection I (WPI)
Premium Efficient



Notes 113 and 114 indicate Ultra+ with bearing fluting protection

HP: 3 - 1750

HP	RPM	Volts	Frame	Thrust Down	Cat. No.	Model No.	Motor	Coupling BX	Coupling Key	Normally Stocked	Notes
1000	1800	460	B513TP30	21,900	**V929**	5KS513DAJ6041		2.438	0.625	N	114, 132, 169, 176
1000	1800	2300/4000	B513TP30	44,796	**V978**	5KS513DAJ6031		2.188	0.500	N	114, 132, 156, 165
1250	1800	2300/4000	B585TP30	50,000	**V501**	5KS585DAJ6020	Call dealer	Not Included		N	114, 132, 156, 176
1250	1800	2300/4000	B585TP36	50,000	**V504**	5KS585DAJ6023	Call dealer	Not Included		N	114, 132, 156, 176
1500	1800	2300/4000	B585TP30	50,000	**V502**	5KS585DAJ6021	Call dealer	Not Included		N	114, 132, 156, 176
1500	1800	2300/4000	B585TP36	50,000	**V505**	5KS585DAJ6024	Call dealer	Not Included		N	114, 132, 156, 176
1750	1800	2300/4000	B585TP30	50,000	**V503**	5KS585DAJ6022	Call dealer	Not Included		N	114, 132, 156, 176
1750	1800	2300/4000	B585TP36	50,000	**V506**	5KS585DAJ6025	Call dealer	Not Included		N	114, 132, 156, 176

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap
117 Also certified for UL Fire Pump Usage
132 Includes NC Winding Thermostats
156 With Spherical Roller Bearing water cooling required
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
168 2500 cubic inch conduit box 2-3" NPT
169 5700 cubic inch conduit box
176 Formed Coil Epoxy VPI
194 Has 100 ohm winding and bearing RTDs

Ultra+™ Vertical Hollow Shaft

Inverter Duty with Bearing Fluting Protection
Weather Protection I (WPI)
Premium Efficient



HP: 10 - 1750

HP	RPM	Volts	Frame	Thrust Down	Cat. No.	Model No.	Motor Coupling BX	Motor Coupling Key	Normally Stocked	Notes
10	1800	460	L215TP10	2,071	**V4914**	5KS215DAE6045	1.000	0.250	N	110, 113, 132
10	1200	460	L256TP10	2,958	**V4915**	5KS256DAE7024	1.000	0.250	N	110, 113, 132
15	1800	230/460	L254TP10	2,575	**V4506**	5KS254DAE6060	1.000	0.250	N	111, 113, 132
20	1800	230/460	L256TP10	2,575	**V4507**	5KS256DAE6090	1.000	0.250	N	111, 113, 132
20	1200	460	L286TP10	3,379	**V4916**	5KS286DAE7040	1.000	0.250	N	110, 113, 132, 166
25	1800	230/460	L284TP12	2,960	**V4512**	5KS284DAE6086	1.000	0.250	N	111, 113, 132, 166
25	1800	230/460	L284TP16	2,960	**V4504**	5KS284DAE6085	1.000	0.250	N	111, 113, 132, 166
25	1200	460	L324TP12	7,177	**V4917**	5KS324DAJ7028	1.250	0.250	N	110, 113, 132
30	1800	230/460	L286TP12	2,960	**V4517**	5KS286DAE6105	1.000	0.250	N	111, 113, 132, 166
30	1800	230/460	L286TP16	2,960	**V4505**	5KS286DAE6104	1.000	0.250	N	111, 113, 132, 166
30	1200	460	L326TP12	7,177	**V4918**	5KS326DAJ7029	1.250	0.250	N	110, 113, 132
40	1800	230/460	L324TP12	6,324	**V4514**	5KS324DAJ6052	1.250	0.250	N	111, 113, 132
40	1800	230/460	L324TP16	6,324	**V4513**	5KS324DAJ6021	1.250	0.250	N	111, 113, 132
40	1800	230/460	L324TP16	6,324	**V4044**	5KS324DAJ6067	1.500	0.375	N	111, 113, 132
40	1800	575	L324TP16	5,700	**V4550**	5KS324DAJ6022	1.250	0.250	N	113, 132
40	1200	460	L364TP16	7,077	**V4919**	5KS364DAJ7031	1.250	0.250	N	110, 113, 116, 132, 167
50	3600	230/460	L324TP16	5,272	**V4501**	5KS324DAJ5028	1.000	0.250	N	111, 113, 132
50	1800	230/460	L326TP16	6,324	**V4515**	5KS326DAJ6020	1.250	0.250	Y	111, 113, 132
50	1800	230/460	L326TP16	6,324	**V4046**	5KS326DAJ6070	1.500	0.375	N	111, 113, 132
50	1800	575	L326TP16	5,700	**V4551**	5KS326DAJ6021	1.188	0.250	N	113, 132
50	1200	460	L365TP16	7,077	**V4920**	5KS365DAJ7036	1.250	0.250	N	110, 113, 116, 132, 167
60	3600	230/460	L326TP16	5,272	**V4502**	5KS326DAJ5026	1.188	0.250	N	111, 113, 132
60	1800	230/460	L364TP16	6,244	**V4509**	5KS364DAJ6074	1.188	0.250	N	111, 113, 116, 132, 167
60	1800	460 PWS	L364TP16	6,244	**V4518**	5KS364DAJ6020	1.250	0.250	N	110, 113, 116, 132, 167
60	1800	460 PWS	L364TP16	6,244	**V4045**	5KS364DAJ6067	1.500	0.375	N	110, 113, 116, 132, 167

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
111 Usable on 190/380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
113 Aegis Shaft Grouding ring on bearing cap
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap
116 Maximum BX diameter is 1.5 inches.
132 Includes NC Winding Thermostats
156 With Spherical Roller Bearing water cooling required
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
166 137 cubic inch conduit box
167 346 cubic inch conduit box

Ultra+™ Vertical Hollow Shaft

Inverter Duty with Bearing Fluting Protection
Weather Protection I (WPI)
Premium Efficient



HP: 10 - 1750

HP	RPM	Volts	Frame	Thrust Down	Motor Cat. No.	Model No.	Coupling BX	Coupling Key	Normally Stocked	Notes
60	1800	575	L364TP16	5,700	**V4552**	5KS364DAJ6021	1.250	0.250	N	113, 116, 132, 167
60	1200	460	L404TP16	8,538	**V4921**	5KS404DAJ7027	1.500	0.375	N	110, 113, 132
75	3600	230/460	L364TP16	5,225	**V4503**	5KS364DAJ5030	1.188	0.250	N	111, 113, 132, 163
75	1800	230/460	L365TP16	6,244	**V4510**	5KS365DAJ6100	1.188	0.250	N	111, 113, 116, 132, 163
75	1800	460 PWS	L365TP16	6,244	**V4520**	5KS365DAJ6020	1.250	0.250	Y	110, 113, 116, 132, 167
75	1800	460 PWS	L365TP16	6,244	**V4042**	5KS365DAJ6086	1.500	0.375	N	110, 113, 116, 132, 167
75	1800	575	L365TP16	5,700	**V4553**	5KS365DAJ6021	1.250	0.250	N	113, 116, 132, 167
75	1200	460 PWS	L405TP16	16,516	**V4516**	5KS405DAJ7031	1.250	0.250	N	110, 113
100	3600	230/460	L365TP16	5,224	**V4508**	5KS365DAJ5029	1.188	0.250	N	111, 113, 116, 132, 163
100	1800	230/460	L404TP16	7,539	**V4511**	5KS404DAJ6081	1.188	0.250	N	111, 113, 132
100	1800	460 PWS	L404TP16	14,609	**V4521**	5KS404DAJ6020	1.500	0.375	Y	110, 113, 132
100	1800	575	L404TP16	6,700	**V4554**	5KS404DAJ6021	1.500	0.375	N	113, 132
100	1800	575	L404TP16	6,700	**V4561**	5KS404DAJ6071	1.250	0.375	N	113, 132
100	1200	460	L444TP16	16,082	**V4560**	5KS444DAJ7035	1.500	0.375	N	114, 132, 163
125	1800	460 PWS	L405TP16	14,609	**V4524**	5KS405DAJ6020	1.500	0.375	N	110, 114, 132
125	1800	575	L405TP16	6,700	**V4555**	5KS405DAJ6021	1.500	0.375	N	114, 132
125	1200	460	L445TP16	16,083	**V4934**	5KS445DAJ7064	1.688	0.375	N	110, 114, 132, 163
125	1200	460	L445TP20	16,083	**V4925**	5KS445DAJ7062	1.688	0.375	N	132, 163
150	1800	460 PWS	L444TP16	14,462	**V4526**	5KS444DAJ6021	1.688	0.375	Y	110, 114, 132, 163
150	1800	575	L444TP16	13,500	**V4556**	5KS444DAJ6023	1.688	0.375	N	114, 132, 163
150	1200	460	L445TP16	16,083	**V4935**	5KS445DAJ7065	1.688	0.375	N	110, 114, 132, 163

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
111 Usable on 190/380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
113 Aegis Shaft Grouding ring on bearing cap
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap
116 Maximum BX diameter is 1.5 inches.
132 Includes NC Winding Thermostats
156 With Spherical Roller Bearing water cooling required
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
167 346 cubic inch conduit box
168 2500 cubic inch conduit box 2-3" NPT
169 5700 cubic inch conduit box

Ultra+™ Vertical Hollow Shaft

Inverter Duty with Bearing Fluting Protection
Weather Protection I (WPI)
Premium Efficient



HP: 10 - 1750

HP	RPM	Volts	Frame	Thrust Down	Cat. No.	Motor Model No.	Coupling BX	Coupling Key	Normally Stocked	Notes
200	1800	460 PWS	L444TP20	22,551	**V4528**	5KS444DAJ6022	1.688	0.375	Y	110, 114, 132, 163
200	1800	575	L444TP20	13,500	**V4557**	5KS444DAJ6024	1.688	0.375	N	114, 132, 163
200	1200	460	L447TP20	15,726	**V4924**	5KS447DAJ7046	1.688	0.375	N	110, 114, 132, 163
250	1800	460 PWS	L445TP20	22,551	**V4529**	5KS445DAJ6020	1.688	0.375	Y	110, 114, 132, 164
250	1800	575	L445TP20	21,100	**V4558**	5KS445DAJ6021	1.688	0.375	N	114, 132, 163
250	1200	460	L447TP20	15,726	**V4936**	5KS447DAJ7050	1.938	0.500	N	110, 114, 132, 163
300	1800	460 PWS	L447TP20	22,277	**V4530**	5KS447DAJ6021	1.688	0.375	N	111, 114, 132, 164
300	1800	460 PWS	L447TP20	22,277	**V4523**	5KS447DAJ6101	1.938	0.500	N	110, 114, 132, 164
300	1800	575	L447TP20	20,800	**V4559**	5KS447DAJ6023	1.688	0.375	N	114, 132, 164
300	1200	460	L449TP20	15,725	**V4926**	5KS449DAJ7052	1.938	0.500	N	110, 114, 132, 164
350	1800	460 PWS	L447TP20	22,277	**V4531**	5KS447DAJ6022	1.688	0.375	N	110, 114, 132, 164
400	1800	460 PWS	L449TP20	20,800	**V4532**	5KS449DAJ6021	1.938	0.500	N	110, 114, 132, 165
400	1800	460 PWS	L449TP20	30,000	**V4533**	5KS449DAJ6023	1.938	0.500	N	110, 114, 132, 165
450	1800	460 PWS	L449TP20	30,000	**V4534**	5KS449DAJ6020	1.938	0.500	N	110, 114, 132, 165
500	1800	460	B509TP20	31,604	**V959**	5KS509DAJ6028	2.188	0.500	N	110, 114, 132, 168, 176
500	1800	460 PWS	B509TP24	27,484	**V921**	5KS509DAJ6069	2.188	0.500	Y	110, 114, 132, 165, 176
500	1800	460 PWS	B509TP24	45,304	**V922**	5KS509DAJ6071	2.188	0.500	N	110, 114, 132, 156, 165, 176
500	1800	2300	B509TP20	13,984	**V979**	5KS509DAJ6055	2.188	0.500	N	114, 194

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
111 Usable on 190/380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
113 Aegis Shaft Grouding ring on bearing cap
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap
116 Maximum BX diameter is 1.5 inches.
132 Includes NC Winding Thermostats
156 With Spherical Roller Bearing water cooling required
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
168 2500 cubic inch conduit box 2-3" NPT
169 5700 cubic inch conduit box
176 Formed Coil Epoxy VPI
194 Has 100 ohm winding and bearing RTDs

Ultra+™ Vertical Hollow Shaft

Inverter Duty with Bearing Fluting Protection
Weather Protection I (WPI)
Premium Efficient



HP: 10 - 1750

HP	RPM	Volts	Frame	Thrust Down	Cat. No.	Model No.	Motor	Coupling BX	Coupling Key	Normally Stocked	Notes
600	1800	460 PWS	B511TP24	26,976	**V923**	5KS511DAJ6041		2.188	0.500	Y	110, 114, 132, 176
600	1800	460 PWS	B5013TP24	44,796	**V4564**	5KS513DAJ6046		2.188	0.500	Y	110, 114, 132, 156, 169, 176, 200
600	1800	460 PWS	B511TP30	26,976	**V924**	5KS511DAJ6039		2.188	0.500	N	110, 114, 132, 176
700	1800	460	B513TP24	26,976	**V920**	5KS513DAJ6038		2.188	0.500	N	114, 132, 169, 176
700	1800	460 PWS	B5013TP24	44,796	**V4564**	5KS513DAJ6046		2.188	0.500	Y	110, 114, 132, 156, 169, 176, 200
800	1800	460 PWS	B5013TP24	44,796	**V4564**	5KS513DAJ6046		2.188	0.500	Y	110, 114, 132, 156, 169, 176, 200
800	1800	460 PWS	B513TP30	44,796	**V928**	5KS513DAJ6042		2.188	0.500	N	114, 132, 156, 169, 176
900	1800	2300/4000	B513TP24	44,796	**V976**	5KS513DAJ6029		2.188	0.500	N	114, 132, 156, 165
900	1800	2300/4000	B513TP30	44,796	**V977**	5KS513DAJ6030		2.188	0.500	N	114, 132, 156, 165
1000	1800	460	B513TP30	21,900	**V929**	5KS513DAJ6041		2.438	0.625	N	114, 132, 169, 176
1250	1800	2300/4000	B585TP30	50,000	**V501**	5KS585DAJ6020	Call dealer	Not Included		N	114, 132, 156, 176
1250	1800	2300/4000	B585TP36	50,000	**V504**	5KS585DAJ6023	Call dealer	Not Included		N	114, 132, 156, 176
1500	1800	2300/4000	B585TP30	50,000	**V502**	5KS585DAJ6021	Call dealer	Not Included		N	114, 132, 156, 176
1500	1800	2300/4000	B585TP36	50,000	**V505**	5KS585DAJ6024	Call dealer	Not Included		N	114, 132, 156, 176
1750	1800	2300/4000	B585TP30	50,000	**V503**	5KS585DAJ6022	Call dealer	Not Included		N	114, 132, 156, 176
1750	1800	2300/4000	B585TP36	50,000	**V506**	5KS585DAJ6025	Call dealer	Not Included		N	114, 132, 156, 176

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap
132 Includes NC Winding Thermostats
156 With Spherical Roller Bearing water cooling required
163 700 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
169 5700 cubic inch conduit box
176 Formed Coil Epoxy VPI
194 Has 100 ohm winding and bearing RTDs
200 600/700/800HP tri-rated model. Extra nameplates will be supplied in conduit box.

Fire Pump Duty Motors
Vertical Hollow Shaft

Standard Features



Emporium Energy

Type	Fire Pump Duty VHS (EPACT Eff.)	Fire Pump Duty VHS (NEMA Prem. Eff.)
HP Range	15 - 400	40 - 400
Poles	4	4
Voltage	200-230/460, 230/460, 460 PWS, 460/575	230/460, 460 PWS
Efficiency	EPACT	NEMA Premium
Frequency	60 Hz (De-rated at 50 Hz and noted on the nameplate.)	60 Hz (De-rated at 50 Hz and noted on the nameplate.)
NEMA Design	B	B
Agency Approvals	UL - Component and Insulation System Recognition, CSA - Motors UL - Firepump	UL - Component and Insulation System Recognition, CSA - Motors UL - Firepump
Altitude	3300 ft	3300 ft
Ambient	40ºC	40ºC
Balance/Vibration	Special Balance = 0.075 IPS	Special Balance = 0.075 IPS
Bearing Caps	Yes	Yes
Bearing Protection	Shaft Slinger	Shaft Slinger
Bearing Type	High Thrust and Extra High Thrust	High Thrust and Extra High Thrust
Conduit Box	Cast Iron	Cast Iron
Coupling	Non-Reverse Standard, kitted for Self Release, or Bolted Upper Half Coupling ordered separately	Non-Reverse Standard, kitted for Self Release, or Bolted Upper Half Coupling ordered separately
End Shield	Cast Iron	Cast Iron
Fasteners	SAE	SAE
Finishing Varnish	Trickle Treat system	Trickle Treat system
Frame Material	Cast Iron	Cast Iron
Frame Size	254-449	324-449
Grease/Oil	All Guide and 213-286 Thrust Bearings: Polyrex EM, 324-449 Oil Lubricated Thrust Bearings: ISO 32	All Guide and 213-286 Thrust Bearings: Polyrex EM, 324-449 Oil Lubricated Thrust Bearings: ISO 32
Ground	Brass Bolt on Frame and in Conduit Box	Brass Bolt on Frame and in Conduit Box
Inverter Capabilities	Variable Torque 0-60 Hz w/out non-reverse ratchet & *5-60 Hz w/NRR	Variable Torque 0-60 Hz w/out non-reverse ratchet & *5-60 Hz w/NRR
Insulation Class	H	H
Insulation System	GEGARD2400, Non-Hygroscopic, Anti-Fungus, 2400 Volt at .1 microsecond rise time, Exceeds NEMA MG1-31 for variable frequency drives	GEGARD2400, Non-Hygroscopic, Anti-Fungus, 2400 Volt at .1 microsecond rise time, Exceeds NEMA MG1-31 for variable frequency drives
Lifting Means	Yes, Integral to Endshield	Yes, Integral to Endshield
Mounting	Vertical P-Base	Vertical P-Base
Nameplate	Stainless Steel	Stainless Steel
Non-Reverse Ratchet Type	Axial Ball Style	Axial Ball Style
Paint	Grey Epoxyester	Grey Epoxyester
Relubrication	Yes	Yes
Rotor	Cast Aluminum	Cast Aluminum
Service Factor	1.15	1.15
Shaft Grounding	N/A	N/A
Space Heater	115 Volt, 60 Hz	115 Volt, 60 Hz
Temperature Rise	80ºC @ 1.0 SF	80ºC @ 1.0 SF
Tests	NEMA Routine only	NEMA Routine only
Thermostats	N/A	N/A
Time Rating	Continuous	Continuous
Top Hat/Fan Cover	Cast Aluminum	Cast Aluminum
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first	36 months from date of installation or 42 months from date of manufacture, whichever occurs first

Fire Pump Duty Motors
Vertical Hollow Shaft

EPACT Efficient and Premium Efficient
Inverter Duty



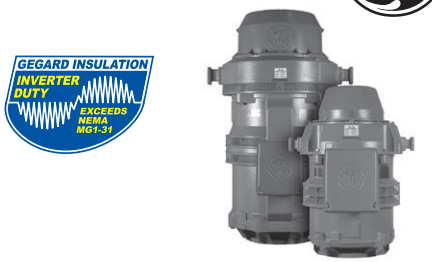
HP: 15 - 400

HP	RPM	Volts	Frame	Thrust Down (lbs)	Max LRA @ 460 V	Cat. No.	Model No.	Motor Coupling BX	Motor Coupling Key	Norm. Stk.	Notes
15	1800	230/460	L254TP10	2,570	116.0	**VF101**	5KE254DAE6020	1.000	0.250	N	
15	1800	200-230/460	L254TP10	2,570	116.0	**VF118**	5KE254DAE6021	1.188	0.250	N	111
20	1800	230/460	L256TP10	2,570	145.0	**VF102**	5KE256DAE6020	1.000	0.250	N	
20	1800	200-230/460	L256TP10	2,570	145.0	**VF119**	5KE256DAE6021	1.188	0.250	N	111
25	1800	200-230/460	L284TP12	2,960	182.5	**VF120**	5KE284DAE6021	1.188	0.250	N	111, 166
25	1800	230/460	L284TP16	2,960	182.5	**VF103**	5KE284DAE6020	1.000	0.250	N	166
25	1800	200-230/460	L284TP16	2,960	182.5	**VF122**	5KE284DAE6023	1.188	0.250	N	111, 166
30	1800	200-230/460	L286TP12	2,960	217.5	**VF124**	5KE286DAE6022	1.188	0.250	N	111, 167
30	1800	230/460	L286TP16	2,960	217.5	**VF104**	5KE286DAE6020	1.000	0.250	N	166
30	1800	200-230/460	L286TP16	2,960	217.5	**VF126**	5KE286DAE6024	1.188	0.250	N	111, 167
40	1800	200-230/460	L324TP12	6,320	290.0	**V4455**	5KS324DAJ6055	1.188	0.250	N	111, 162
40	1800	230/460	L324TP12	6,324	290.0	**V4412**	5KS324DAJ6020	1.250	0.250	Y	111, 162
40	1800	200-230/460	L324TP12	6,320	290.0	**V4456**	5KS324DAJ6056	1.500	0.375	N	111, 162
40	1800	200-230/460	L324TP16	6,320	290.0	**V4457**	5KS324DAJ6057	1.188	0.250	N	111, 162
40	1800	230/460	L324TP16	6,320	290.0	**VF105**	5KE324DAJ6020	1.250	0.250	N	
40	1800	200-230/460	L324TP16	6,320	290.0	**V4458**	5KS324DAJ6058	1.500	0.375	N	111, 162
40	1800	460 PWS	L324TP16	6,320	290.0	**V4043**	5KS324DAJ6066	1.500	0.375	N	110, 162
40	1800	575	L324TP16	6,320	214.0	**V4056**	5KS324DAJ6071	1.500	0.375	N	162
50	1800	200-230/460	L326TP12	6,320	362.5	**V4459**	5KS326DAJ6061	1.188	0.250	N	111, 162
50	1800	200-230/460	L326TP12	6,320	362.5	**V4460**	5KS326DAJ6062	1.500	0.375	N	111, 162
50	1800	200-230/460	L326TP16	6,320	362.5	**V4461**	5KS326DAJ6063	1.188	0.250	N	111, 162
50	1800	230/460	L326TP16	6,320	362.5	**VF106**	5KE326DAJ6020	1.250	0.250	N	
50	1800	230/460	L326TP16	6,324	362.5	**V4415**	5KS326DAJ6005	1.250	0.250	N	111, 162
50	1800	200-230/460	L326TP16	6,320	362.5	**V4462**	5KS326DAJ6064	1.500	0.375	N	111, 162
50	1800	460 PWS	L326TP16	6,320	362.5	**V4041**	5KS326DAJ6069	1.500	0.375	N	110
60	1800	200-230/460	L364TP12	6,244	435.0	**V4463**	5KS364DAJ6052	1.188	0.250	N	111, 162, 163
60	1800	200-230/460	L364TP12	6,244	435.0	**V4464**	5KS364DAJ6053	1.500	0.375	N	111, 162, 163
60	1800	200-230/460	L364TP16	6,244	435.0	**V4465**	5KS364DAJ6054	1.188	0.250	N	111, 162, 163
60	1800	230/460	L364TP16	6,244	435.0	**VF107**	5KE364DAJ6020	1.250	0.250	N	116, 167
60	1800	230/460	L364TP16	6,244	435.0	**V4417**	5KS364DAJ6005	1.250	0.250	N	111, 116, 162, 167
60	1800	200-230/460	L364TP16	6,244	435.0	**V4466**	5KS364DAJ6055	1.500	0.375	N	111, 162, 163

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
111 Usable on 190/380 Volts, 50 Hz at 1.0 Service Factor and derated to next lower HP.
116 Maximum BX diameter is 1.5 inches.
162 Premium Efficent also meets NEMA Premium
163 700 cubic inch conduit box
166 137 cubic inch conduit box
167 346 cubic inch conduit box

Fire Pump Duty Motors
Vertical Hollow Shaft
EPACT Efficient and Premium Efficient
Inverter Duty



HP: 15 - 400

HP	RPM	Volts	Frame	Thrust Down (lbs)	Max LRA @ 460 V	Cat. No.	Motor Model No.	Coupling BX	Coupling Key	Norm. Stk.	Notes
75	1800	200-230/460	L365TP12	6,244	542.5	**V4467**	5KS365DAJ6076	1.188	0.250	N	111, 162, 163
75	1800	200-230/460	L365TP12	6,244	542.5	**V4468**	5KS365DAJ6077	1.500	0.375	N	111, 162, 163
75	1800	200-230/460	L365TP16	6,244	542.5	**V4469**	5KS365DAJ6078	1.188	0.250	N	111, 162, 163
75	1800	230/460	L365TP16	6,244	542.5	**VF108**	5KE365DAJ6020	1.250	0.250	N	116, 163
75	1800	230/460	L365TP16	6,244	542.5	**V4419**	5KS365DAJ6005	1.250	0.250	Y	111, 116, 162, 163
75	1800	200-230/460	L365TP16	6,244	542.5	**V4470**	5KS365DAJ6079	1.500	0.375	N	111, 162, 163
75	1800	460 PWS	L365TP16	6,244	542.5	**V4040**	5KS365DAJ6085	1.500	0.375	N	110, 116, 167
100	1800	200-230/460	L404TP16	7,539	725.0	**V4471**	5KS404DAJ6062	1.188	0.250	N	111, 162
100	1800	230/460	L404TP16	7,539	725.0	**VF109**	5KE404DAJ6020	1.500	0.375	N	
100	1800	200-230/460	L404TP16	7,539	725.0	**V4472**	5KS404DAJ6063	1.500	0.375	N	111, 162
100	1800	200-230/460	L404TP16	7,539	725.0	**V4473**	5KS404DAJ6064	1.688	0.375	N	111, 162
100	1800	460 PWS	L404TP16	7,539	725.0	**V4421**	5KS404DAJ6008	1.500	0.375	Y	110, 162
100	1800	460/575	L404TP16	7,539	725.0	**V4053**	5KS404DAJ6075	1.500	0.375	N	110, 117
100	1800	460/575	L404TP16	7,539	725.0	**V4054**	5KS404DAJ6076	1.688	0.375	N	110, 117
125	1800	460/575	L405TP16	7,539	907.5	**V4474**	5KS405DAJ6057	1.188	0.250	N	110, 162
125	1800	460 PWS	L405TP16	7,539	907.5	**VF110**	5KE405DAJ6020	1.500	0.375	N	
125	1800	460 PWS	L405TP16	7,539	907.5	**V4424**	5KS405DAJ6008	1.500	0.375	Y	110, 162
125	1800	460/575	L405TP16	7,539	907.5	**V4475**	5KS405DAJ6058	1.500	0.375	N	110, 162
125	1800	460/575	L405TP16	7,539	907.5	**V4476**	5KS405DAJ6059	1.688	0.375	N	110, 162
150	1800	460 PWS	L444TP16	14,462	1,085.0	**VF111**	5KE444DAJ6020	1.688	0.375	N	164
150	1800	460 PWS	L444TP16	14,462	1,085.0	**V4426**	5KS444DAJ6008	1.688	0.375	Y	110, 162, 163
150	1800	460/575	L444TP20	14,462	1,085.0	**V4477**	5KS444DAJ6092	1.500	0.375	N	110, 162, 163
150	1800	460/575	L444TP20	14,462	1,085.0	**V4478**	5KS444DAJ6093	1.688	0.375	N	110, 162, 163
150	1800	460/575	L444TP20	14,462	1,085.0	**V4479**	5KS444DAJ6094	1.938	0.500	N	110, 162, 163
200	1800	460 PWS	L444TP16	14,462	1,450.0	**VF112**	5KE444DAJ6021	1.688	0.375	N	170
200	1800	460 PWS	L444TP16	22,551	1,450.0	**V4427**	5KS444DAJ6020	1.688	0.375	Y	110, 162, 163

Notes:

110 Usable on 380 Volts, 50 Hz at 1.0 Service Factor and derated to next lower HP.
111 Usable on 190/380 Volts, 50 Hz at 1.0 Service Factor and derated to next lower HP.
116 Maximum BX diameter is 1.5 inches.
117 Also certified for UL Fire Pump Usage
162 Premium Efficent also meets NEMA Premium
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
167 346 cubic inch conduit box
170 2500 cubic inch conduit box

Fire Pump Duty Motors
Vertical Hollow Shaft

EPACT Efficient and Premium Efficient
Inverter Duty



HP: 15 - 400

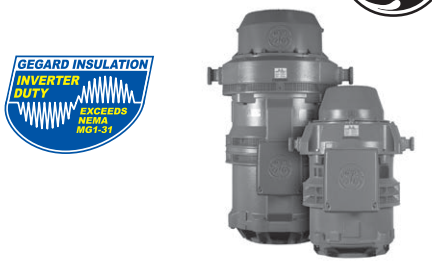
HP	RPM	Volts	Frame	Thrust Down (lbs)	Max LRA @ 460 V	Cat. No.	Model No.	Motor Coupling BX	Motor Coupling Key	Norm. Stk.	Notes
200	1800	460/575	L444TP20	14,462	1,450.0	**V4480**	5KS444DAJ6095	1.500	0.375	N	110, 162, 163
200	1800	460/575	L444TP20	14,462	1,450.0	**V4481**	5KS444DAJ6096	1.688	0.375	N	110, 162, 163
200	1800	460/575	L444TP20	14,462	1,450.0	**V4482**	5KS444DAJ6097	1.938	0.500	N	110, 162, 163
250	1800	460 PWS	L445TP16	14,462	1,825.0	**VF113**	5KE445DAJ6021	1.688	0.375	N	164
250	1800	460/575	L445TP20	14,462	1,825.0	**V4483**	5KS445DAJ6087	1.500	0.375	N	110, 162, 164
250	1800	460/575	L445TP20	14,462	1,825.0	**V4484**	5KS445DAJ6088	1.688	0.375	N	110, 162, 164
250	1800	460 PWS	L445TP20	22,551	1,825.0	**V4429**	5KS445DAJ6008	1.688	0.375	Y	110, 162, 164
250	1800	460/575	L445TP20	14,462	1,825.0	**V4485**	5KS445DAJ6089	1.938	0.500	N	110, 162, 164
300	1800	460 PWS	L447TP16	14,188	2,200.0	**VF114**	5KE447DAJ6020	1.688	0.375	N	164
300	1800	460/575	L447TP20	14,188	2,200.0	**V4486**	5KS447DAJ6062	1.688	0.375	N	110, 162, 164
300	1800	460 PWS	L447TP20	22,277	2,200.0	**V4430**	5KS447DAJ6008	1.688	0.375	Y	110, 162, 164
300	1800	460/575	L447TP20	14,188	2,200.0	**V4487**	5KS447DAJ6063	1.938	0.500	N	110, 162, 164
300	1800	460/575	L447TP20	14,188	2,200.0	**V4488**	5KS447DAJ6064	2.188	0.500	N	110, 162, 164
350	1800	460 PWS	L447TP16	14,188	2,550.0	**VF115**	5KE447DAJ6021	1.688	0.375	N	164
350	1800	460/575	L447TP20	14,188	2,550.0	**V4489**	5KS447DAJ6065	1.688	0.375	N	110, 162, 164
350	1800	460 PWS	L447TP20	22,277	2,550.0	**V4431**	5KS447DAJ6020	1.688	0.375	N	110, 162, 164
350	1800	460/575	L447TP20	14,188	2,550.0	**V4490**	5KS447DAJ6066	1.938	0.500	N	110, 162, 164
350	1800	460/575	L447TP20	14,188	2,550.0	**V4491**	5KS447DAJ6067	2.188	0.500	N	110, 162, 164
350	1800	460/575	L447TP20	14,188	2,550.0	**V4492**	5KS447DAJ6068	2.375	0.625	N	110, 162, 164
400	1800	460 PWS	L449TP16	14,188	2,900.0	**VF116**	5KE449DAJ6021	1.938	0.500	N	170
400	1800	460/575	L449TP20	14,188	2,900.0	**V4493**	5KS449DAJ6095	1.938	0.500	N	110, 162, 170
400	1800	460 PWS	L449TP20	20,800	2,900.0	**V4432**	5KS449DAJ6008	1.938	0.500	N	110, 162, 170
400	1800	460/575	L449TP20	14,188	2,900.0	**V4494**	5KS449DAJ6096	2.188	0.500	N	110, 162, 170
400	1800	460/575	L449TP20	14,188	2,900.0	**V4495**	5KS449DAJ6097	2.375	0.625	N	110, 162, 170

Notes:

110 Usable on 380 Volts, 50 Hz at 1.0 Service Factor and derated to next lower HP.
162 Premium Efficent also meets NEMA Premium
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
170 2500 cubic inch conduit box

Ultra™, Ultra+™ and Fire Pump Vertical Hollow Shaft

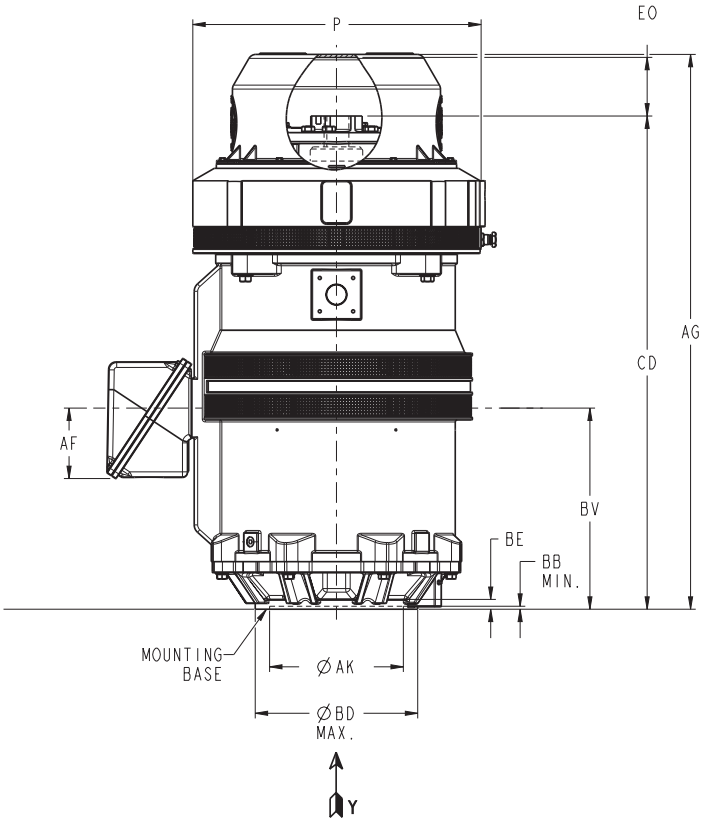
Weather Protection I (WPI)
213 - 5813 Frame

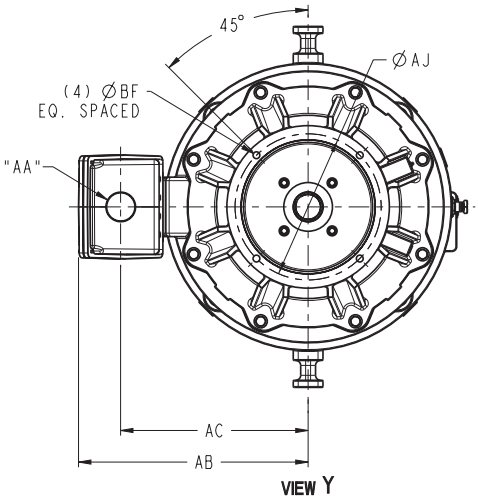


Dimensions

Dimensions on next page

213 - 5813 Frame





Ultra™, Ultra+™ and Fire Pump Vertical Hollow Shaft

Weather Protection I (WPI)

213 - 5813 Frame



Dimensions (cont.)

Dimensions refer to drawings on the previous page

Frame	Dimensions in Inches									
	BD	P	AG	CD	AJ	AK	BE	BF	BV	EO Min
210	10.0	14.76	22.44	18.88	9.13	8.25	0.77	0.44	8.59	2.75
250	10.0	17.20	26.75	23.38	9.13	8.25	0.77	0.44	10.75	3.18
	12.0				9.13	8.25		0.44		
	16.5				14.75	13.50		0.69		
280	10.0	19.32	28.21	24.75	9.13	8.25	0.77	0.44	12.00	3.00
	12.0				9.13	8.25	0.93	0.44		
	16.5				14.75	13.50	0.93	0.69		
320	12.0	19.50	32.58	28.22	9.13	8.25	0.88	0.44	15.79	4.00
	16.5				14.75	13.50				
360	12.0	21.70	35.47	31.16	9.13	8.25	0.88	0.44	17.53	4.00
	16.5				14.75	13.50				
400	16.5	24.50	41.97	36.94	14.75	13.50	1.06	0.69	20.93	4.70
444/445	16.5	29.00	51.00	44.78	14.75	13.50	0.99	0.69	17.80	5.00
	20.0									
	24.5									
447/449	16.5	29.00	56.00	49.78	14.75	13.50	0.99	0.69	20.30	5.00
	20.0									
	24.5									
509	20.0	36.45	63.45	57.06	14.75	13.50	1.40	0.69	23.49	6.08
	24.5				14.75	13.50		0.69		
	30.5				26.00	22.00		0.81		
5011	20.0	36.45	71.45	65.06	14.75	13.50	1.40	0.69	27.49	6.08
	24.5				14.75	13.50		0.69		
	30.5				26.00	22.00		0.81		
5013	20.0	36.45	80.45	74.06	14.75	13.50	1.40	0.69	31.99	6.08
	24.5				14.75	13.50		0.69		
	30.5				26.00	22.00		0.81		
5813	30.5	50.90	100.80	89.70	26.00	22.00	2.30	0.81	56.13	11.00
	36.0				32.00	26.00		1.00		

Conduit Box Dimensions

Frame	CBOX Size (ci)	AA	Dimensions in Inches				
			AB	AC	AF	XL	XN
210	55	1" - NPT	9.41	7.30	3.50	5.79	4.16
250	137	1-1/4" - NPT	12.15	9.12	4.59	7.37	5.20
280	137	1-1/2 - 11.5 NPT	12.79	9.76	4.59	7.37	5.20
	346	2 - 11.5 NPT	14.06	10.40	6.44	10.11	7.00
320	346	3" - 8 NPT	16.77	13.07	6.44	10.15	7.00
360	346	3" - 8 NPT	17.77	14.07	6.44	10.15	7.00
	700	3" - 8 NPT	20.51	16.25	7.00	12.13	10.50
400	700	3" - 8 NPT	21.20	16.94	7.00	12.13	10.50
440	700	3" - 8 NPT	23.17	18.91	7.00	12.13	10.50
	1260	(2) 4" - 8 NPT	23.67	18.91	7.00	12.39	16.25
	2500	(2) 4" - 8 NPT	25.31	19.85	7.69	14.08	27.25
500	2500	(2) 3" - 8 NPT	31.45	25.99	14.20	23.95	14.50
	2500	(2) 4" - 8 NPT	31.27	25.80	14.20	23.95	14.50
	5700	(3) 3" - 8 NPT	35.30	27.80	10.87	23.24	22.25
580	5700	(2) 4" - 8 NPT	35.40	27.90	10.30	23.24	22.25
	12500	(2) 4" - 8 NPT	40.80	32.00	16.00	28.10	28.74

Ultra™, Ultra+™ and Fire Pump Vertical Hollow Shaft

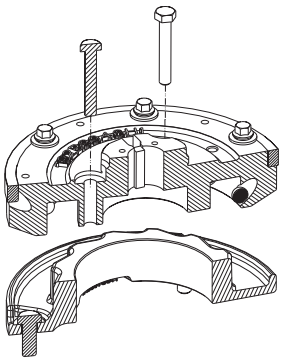
Weather Protection I (WPI)

Ball Style Non-Reverse, Self-Release, Bolted

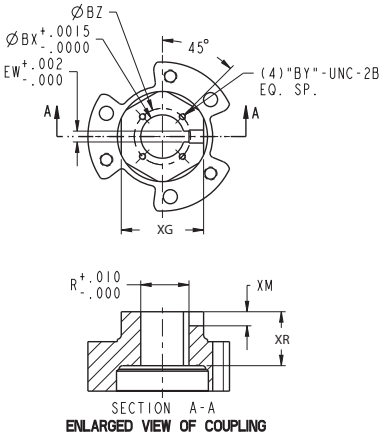
Kits and Accessories



213 - 286 Frame NRR Rachet and Coupling



324 - 511 Frame Coupling



Ultra™, Ultra+™ and Fire Pump Couplings
HP: 5 - 600

Frame	Ball Type Non-Reverse Ratchet Cat. No.	Ball Type Non-Reverse Ratchet Part No.	Self-Release and Bolted Part No.			BX	Keyway Depth	Keyway Width	XG	BY	BZ	XM	XR
213/215	**Y8804**	192B9950EX-G04	4002B5521AB-G04			0.751	0.090	0.189	2.435	# 10-32	1.375	0.438	1.250
	Y8803	192B9950EX-G03	4002B5521AB-G03			0.876	0.125	0.250					
	Y8802	192B9950EX-G02	4002B5521AB-G02			0.939							
	Y8801	192B9950EX-G01	4002B5521AB-G01			1.001							
	Y8805	192B9950EX-G05	N/A			1.032							
254/256/ 284/286	**Y8813**	192B9950EZ-G08	4002B5525AB-G05			0.751	0.091	0.189	2.435	# 10-32	1.375	0.438	1.125
	Y8812	192B9950EZ-G07	4002B5525AB-G04			0.876	0.125	0.250					
	Y8811	192B9950EZ-G06	N/A			0.939							
	Y8810	192B9950EZ-G05	4002B5525AB-G03			1.001							
	Y8814	192B9950EZ-G09	N/A			1.032							
	Y8808	192B9950EZ-G03	N/A			1.066				1/4- 20 UNC	1.750		
	Y8809	192B9950EZ-G04	N/A			1.126							
	Y8807	192B9950EZ-G02	4002B5525AB-G02			1.189							
	Y8806	192B9950EZ-G01	4002B5525AB-G01			1.251							
	Y8815	192B9950EZ-G10	4002B5525AB-G07			1.251	0.188	0.375					

Ultra™, Ultra+™ and Fire Pump Vertical Hollow Shaft

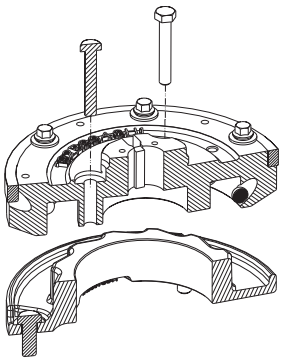
Weather Protection I (WPI)

Ball Style Non-Reverse, Self-Release, Bolted

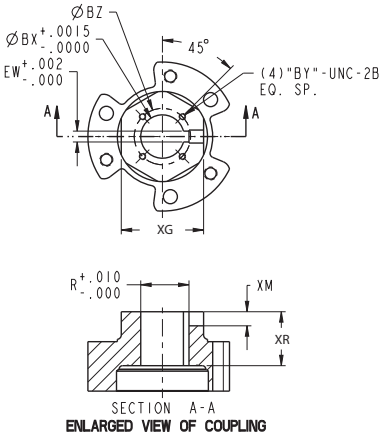
Kits and Accessories (cont.)



213 - 286 Frame NRR Rachet and Coupling



324 - 511 Frame Coupling



Ultra™, Ultra+™ and Fire Pump Couplings
HP: 5 - 600

Frame Size	Cat. No.	Part No.			Dimension in Inches							
					BX	Depth	EW	XG	BY	BZ	XM	XR
324/326	**Y8730**	192B9950FA-G21			1.001	0.118	0.250	3.243	1/4-20 UNC	1.375	0.438	1.913
	Y8731	192B9950FA-G22			1.188	0.133				1.750		
	Y8732	192B9950FA-G23			1.251							
	Y8733	192B9950FA-G24			1.251	0.169	0.375					
	Y8734	192B9950FA-G25			1.438	0.172				2.125		
	Y8735	192B9950FA-G26			1.501							
364/365	**Y8730**	192B9950FA-G21			1.001	0.118	0.250	3.243	1/4-20 UNC	1.375	0.438	1.913
	Y8731	192B9950FA-G22			1.188	0.133				1.750		
	Y8732	192B9950FA-G23			1.251							
	Y8733	192B9950FA-G24			1.251	0.169	0.375					
	Y8734	192B9950FA-G25			1.438	0.172				2.125		
	Y8735	192B9950FA-G26			1.501							
404/405	**Y8741**	192B9950FC-G21			1.188	0.121	0.250	3.250	1/4-20 UNC	1.750	0.562	2.413
	Y8742	192B9950FC-G22			1.251							
	Y8743	192B9950FC-G23			1.251	0.168	0.375					
	Y8744	192B9950FC-G24			1.438	0.172				2.125		
	Y8745	192B9950FC-G25			1.501							
	Y8746	192B9950FC-G26			1.688	0.176				2.500		
	Y8747	192B9950FC-G27			1.751							
444/445 and 447/449	**Y8655**	192B9950EG-G02			1.501	0.180	0.375	4.750	1/4-20 UNC	2.125	0.812	3.112
	Y8656	192B9950EG-G03			1.688					2.500		
	Y8658	192B9950EG-G05			1.813	0.230	0.500					
	Y8659	192B9950EG-G06			1.938							
	Y8662	192B9950EG-G09			2.126				3/8-16 UNC	3.250		
	Y8651	192B9950EG-G10			2.188							
	Y8665	192B9950EG-G12			2.376							
509/511/513	**Y8826**	192B9950FF-G02			1.501	0.188	0.375	4.750	.250-20 UNC	2.125	0.562	4.165
	Y8827	192B9950FF-G03			1.688					2.500		
	Y8828	192B9950FF-G04			1.751							
	Y8829	192B9950FF-G05			1.813	0.250	0.500				0.688	
	Y8830	192B9950FF-G06			1.938							
	Y8831	192B9950FF-G07			2.001				.375-16 UNC	3.250		
	Y8832	192B9950FF-G08			2.188							
	Y8833	192B9950FF-G09			2.251							
	Y8834	192B9950FF-G10			2.438	0.313	0.625			3.750	0.812	
	Y8835	192B9950FF-G11			2.501							
	Y8836	192B9950FF-G12			2.626							
	Y8837	192B9950FF-G13			2.688							
	Y8838	192B9950FF-G14			2.751							

320-500 Frame - “Standard” non-reverse coupling shipped with motor. For other sizes order from above list.

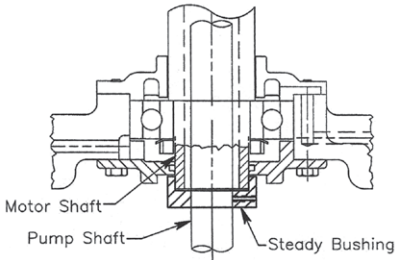
Ultra™ and Ultra+™ Vertical Hollow Shaft

Weather Protection I (WPI) and
Totally Enclosed Fan Cooled (TEFC)
Stabilizer Bushings

Kits and Accessories







Ultra™ and Ultra+™ WPI/TEFC VHS Stabilizer Bushings
HP: 5 - 400

Frame Size	Cat. No.	Part Number			Dimensions in Inches	
					BX	A
210	**Y8414**	4001A5521AA-G01			1.001	1.573
250	**Y8415**	4001A5525AA-G03			1.001	1.767
	Y8416	4001A5525AA-G02			1.188	
	Y8417	4001A5525AA-G01			1.251	
280	**Y8418**	4001A5528AA-G03			1.001	1.964
	Y8419	4001A5528AA-G02			1.188	
	Y8420	4001A5528AA-G01			1.251	
320/360	**Y8470**	249A4245AD-G05			1.001	2.266
	Y8421	249A4245AD-G04			1.188	
	Y8422	249A4245AD-G03			1.250	
	Y8423	249A4245AD-G02			1.438	
	Y8424	249A4245AD-G01			1.501	
400	**Y8471**	249A4245AE-G06			1.189	2.7827
	Y8472	249A4245AE-G05			1.250	
	Y8426	249A4245AE-G03			1.501	
	Y8473	249A4245AE-G02			1.688	
440	**Y8474**	249A4245BJ-G01			1.501	3.000
	Y8475	249A4245BJ-G02			1.688	
	Y8476	249A4245BJ-G05			1.938	
	Y8477	249A4245BJ-G09			2.188	

Ultra™ and Ultra+™ Vertical Hollow Shaft

Weather Protection I (WPI) and
Totally Enclosed Fan Cooled (TEFC)
P-Base Kits

Kits and Accessories



P-Base Kits

Frame	BD Diameter	Kit Number
250	10	128D6124PA1
	12	128D6125PA1
	16	128D6126PA1
280	10	128D6235AC1
	12	128D6235AB1
	16	128D6235AA1
320	12	115E7204AC1
	16	115E7205AA1
360	12	115E7254AC1
	16	115E7255AA1
400	16	115E7306AC1
	20	115E7307AA1
440	16	115E7660AA1
	20	115E7661AA1
	24	115E7662AA1

Ultra™ TEFC Vertical Hollow Shaft

Inverter Duty with Bearing Fluting Protection (40HP and up)
Totally Enclosed Fan Cooled (TEFC)
Premium Efficient



Standard Features

HP Range	5 - 700
Poles	2, 4
Voltage	230/460, 460
Efficiency	NEMA Premium
Frequency	60 Hz (De-rated at 50 Hz and noted on the nameplate.)
NEMA Design	B
Agency Approvals	UL - Component and Insulation System Recognition, CSA - Motors
Altitude	3300 ft
Ambient	40ºC
Balance/Vibration	Special Balance = 0.075 IPS
Bearing Caps	Yes
Bearing Protection	Shaft Slinger
Bearing Type	High Thrust
Conduit Box	Cast Iron
Coupling	Non-Reverse Standard. 320 frame and higher kitted for self-release or bolted
End Shield	Cast Iron
Fan Cover	Cast Iron
Fasteners	SAE
Finishing Varnish	Trickle Treat system
Frame Material	Cast Iron
Frame Size	213-449
Grease/Oil	All Guide and 213-286 Thrust Bearings: Polyrex EM, 324-449 Oil Lubricated Thrust Bearings: ISO 32
Ground	Brass Bolt on Frame and in Conduit Box
Insulation Class	H
Insulation System	GEGARD2400, Non-Hygroscopic, Anti-Fungus, 2400 Volt at .1 microsecond rise time, Exceeds NEMA MG1-31 for variable frequency drives
Inverter Capabilities	Variable Torque 0-60 Hz w/out non-reverse ratchet & *5-60 Hz w/ NRR
Lifting Means	Yes, Integral to Endshield
Mounting	Vertical P-Base
Nameplate	Stainless Steel
Non-Reverse Ratchet Type	Axial Ball Style
Paint	Buff Epoxyester
Relubrication	Yes
Rotor	Cast Aluminum
Service Factor	1.15
Shaft Grounding	40-100HP: Aegis SGR on Bearing Cap, 125HP and up: Aegis SGR on Bearing Cap and Insulated Upper Bearing Carrier
Space Heater	115 Volt, 60 Hz
Temperature Rise	80°C @ 1.0 SF
Tests	NEMA Routine only
Thermostats	Includes NC Winding Thermostats (40HP and greater)
Time Rating	Continuous
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first

Ultra™ TEFC Vertical Hollow Shaft

Inverter Duty with Bearing Fluting Protection (40HP and up)
Totally Enclosed Fan Cooled (TEFC)
Premium Efficient



Volts: 230/460, 460
HP: 5 - 700

HP	RPM	Volts	Frame	Thrust Down	Motor Cat. No.	Model No.	Coupling BX	Coupling Key	Normally Stocked	Notes
5	3600	230/460	L213TP10	1,663	**V4022**	5KS213SAE5035	1.000	0.250	N	51, 111
5	1800	230/460	L213TP10	2,071	**V4026**	5KS213SAE6056	1.000	0.250	N	51, 111
7.5	3600	230/460	L213TP10	1,658	**V4023**	5KS213SAE5036	1.000	0.250	N	51, 111
7.5	1800	230/460	L213TP10	2,071	**V4027**	5KS213SAE6054	1.000	0.250	N	51, 111
10	3600	230/460	L215TP10	1,658	**V4024**	5KS215SAE5027	1.000	0.250	N	51, 111
10	1800	230/460	L215TP10	2,065	**V4028**	5KS215SAE6042	1.000	0.250	N	51, 111
10	1200	460	L256TP10	2,958	**V4735**	5KS256SAE7026	1.000	0.250	N	51, 110, 113, 132
15	3600	230/460	L254TP10	2,070	**V4025**	5KS254SAE5033	1.000	0.250	N	51, 111
15	1800	230/460	L254TP10	2,570	**V4029**	5KS254SAE6057	1.000	0.250	N	51, 111
20	1800	230/460	L256TP10	2,597	**V4030**	5KS256SAE6062	1.000	0.250	N	51, 111
20	1200	460	L286TP10	3,379	**V4736**	5KS286SAE7035	1.000	0.250	N	51, 110, 113, 132, 166
25	3600	230/460	L284TP10	2,363	**V4052**	5KS284SAE5038	1.000	0.250	N	51, 111
25	1800	230/460	L284TP16	2,976	**V4031**	5KS284SAE6054	1.000	0.250	N	51, 111
25	1200	460	L324TP12	7,177	**V4734**	5KS324SAJ7029	1.250	0.250	N	51, 110, 113, 132
30	1800	230/460	L286TP16	2,959	**V4032**	5KS286SAE6061	1.000	0.250	N	51, 111
30	1200	460	L326TP12	7,177	**V4737**	5KS326SAJ7033	1.250	0.250	N	51, 110, 113, 132
40	1800	230/460	L324TP16	6,324	**V4726**	5KS324SAJ6050	1.188	0.250	N	51, 111, 113, 132
40	1800	230/460	L324TP16	6,324	**V4733**	5KS324SAJ6054	1.000	0.250	N	51, 111, 113, 132
40	1800	230/460	L324TP16	6,324	**V4732**	5KS324SAJ6052	1.188	0.250	N	51, 111, 113, 132
40	1800	230/460	L324TP16	6,324	**V4711**	5KS324SAJ6005	1.250	0.250	N	51, 111, 113, 132
40	1200	460	L364TP16	7,078	**V4748**	5KS364SAJ7039	1.250	0.250	N	51, 110, 113, 132
50	1800	230/460	L326TP16	6,324	**V4728**	5KS326SAJ6054	1.000	0.250	N	51, 111, 113, 132
50	1800	230/460	L326TP16	6,324	**V4712**	5KS326SAJ6005	1.250	0.250	Y	51, 111, 113, 132
50	1200	460	L365TP16	7,078	**V4738**	5KS365SAJ7037	1.250	0.250	N	51, 110, 113, 132
60	1800	460	L364TP16	5,700	**V4713**	5KS364SAJ6008	1.250	0.250	N	51, 110, 113, 132, 167
60	1200	460	L404TP16	8,538	**V4745**	5KS404SAJ7036	1.500	0.375	N	51, 110, 113, 132

Notes:

51 Space Heater, 115V/60 Hz
110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
111 Usable on 190/380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
113 Aegis Shaft Grouding ring on bearing cap (40-100HP)
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap (125HP and greater)
132 Includes NC Winding Thermostats
166 137 cubic inch conduit box
167 346 cubic inch conduit box
195 Includes 100 ohm winding RTDs

Ultra™ TEFC Vertical Hollow Shaft

Inverter Duty with Bearing Fluting Protection (40HP and up)
Totally Enclosed Fan Cooled (TEFC)
Premium Efficient



Volts: 230/460, 460
HP: 5 - 700

HP	RPM	Volts	Frame	Thrust Down	Cat. No.	Model No.	Motor Coupling BX	Motor Coupling Key	Normally Stocked	Notes
75	1800	460	L365TP16	5,700	**V4714**	5KS365SAJ6008	1.250	0.250	N	51, 110, 113, 132, 167
75	1200	460	L405TP16	8,500	**V4722**	5KS405SAJ7008	1.250	0.375	N	51, 110, 113, 132
100	1800	460	L405TP16	6,700	**V4715**	5KS405SAJ6008	1.500	0.375	Y	51, 110, 113, 132
100	1200	460	L444TP16	16,033	**V4739**	5KS444SAJ7037	1.688	0.375	N	51, 110, 114, 132, 163
125	1800	460	L444TP16	13,500	**V4716**	5KS444SAJ6008	1.500	0.375	N	51, 110, 114, 132, 163
125	1200	460	L445TP16	16,083	**V4740**	5KS445SAJ7036	1.688	0.375	N	51, 110, 114, 132, 163
150	1800	460	L445TP16	13,500	**V4717**	5KS445SAJ6008	1.500	0.375	N	51, 110, 114, 132, 163
150	1800	460	L445TP20	14,462	**V4727**	5KS445SAJ6058	1.688	0.375	N	51, 110, 114, 132, 163
150	1200	460	L447TP20	15,726	**V4742**	5KS447SAJ7028	1.688	0.375	N	51, 110, 114, 132, 163
200	1800	460	L447TP16	13,300	**V4718**	5KS447SAJ6008	1.688	0.375	N	51, 110, 114, 132, 163
200	1200	460	L449TP20	15,725	**V4741**	5KS449SAJ7046	1.688	0.375	N	51, 110, 114, 132, 163
250	1800	460	L449TP16	13,300	**V4719**	5KS449SAJ6008	1.688	0.375	N	51, 110, 114, 132, 164
250	1200	460	B509TP24	21,915	**V4721**	5KS509SAJ7020	2.438	0.625	N	51, 110, 114, 132, 164
300	1800	460	L449TP16	13,300	**V4720**	5KS449SAJ6020	1.688	0.375	N	51, 110, 114, 132, 164
300	1800	460	L449TP16	22,776	**V4724**	5KS449SAJ6087	1.938	0.375	N	51, 110, 114, 132, 164
300	1200	460	B509TP20	20,749	**V4743**	5KS509SAJ7026	2.188	0.500	N	51, 110, 114, 132, 164
350	1800	460	B509TP20	12,142	**V4749**	5KS509SAJ6039	2.188	0.500	N	51, 110, 114, 132, 164
350	1800	460	B509TP24	12,142	**V4754**	5KS509SAJ6044	2.188	0.500	N	51, 110, 114, 132, 164
350	1200	460	B5011TP20	13,197	**V4744**	5KS511SAJ7028	2.188	0.500	N	51, 110, 114, 132, 164

Notes:

51 Space Heater, 115V/60 Hz
110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
111 Usable on 190/380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
113 Aegis Shaft Grouding ring on bearing cap (40-100HP)
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap (125HP and greater)
132 Includes NC Winding Thermostats
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
167 346 cubic inch conduit box
195 Includes 100 ohm winding RTDs

Ultra™ TEFC Vertical Hollow Shaft

Inverter Duty with Bearing Fluting Protection (40HP and up)
Totally Enclosed Fan Cooled (TEFC)
Premium Efficient



Volts: 230/460, 460
HP: 5 - 700

HP	RPM	Volts	Frame	Thrust Down	Cat. No.	Model No.	Motor Coupling BX	Motor Coupling Key	Normally Stocked	Notes
400	1800	460	B509TP20	12,142	**V4750**	5KS509SAJ6040	2.188	0.500	N	51, 110, 114, 132, 165
400	1800	460	B509TP24	12,142	**V4753**	5KS509SAJ6043	2.188	0.500	N	51, 110, 114, 132, 165
400	1200	460	B5013TP20	20,749	**V4746**	5KS513SAJ7039	2.188	0.500	N	51, 110, 114, 132, 165
450	1800	460	B5011TP24	11,634	**V4752**	5KS511SAJ6037	2.188	0.500	N	51, 110, 114, 132, 165
450	1200	460	B5013TP20	13,000	**V4747**	5KS513SAJ7037	2.188	0.500	N	51, 110, 114, 132, 165
500	1800	460	B5011TP24	38,476	**V4730**	5KS511SAJ6034	2.438	0.625	N	51, 114, 132, 195
700	1800	460	B5013TP24	38,400	**V4731**	5KS513SAJ6032	2.188	0.625	N	51, 114, 195

Notes:

51 Space Heater, 115V/60 Hz
110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
111 Usable on 190/380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
113 Aegis Shaft Grouding ring on bearing cap (40-100HP)
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap (125HP and greater)
132 Includes NC Winding Thermostats
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
195 Includes 100 ohm winding RTDs

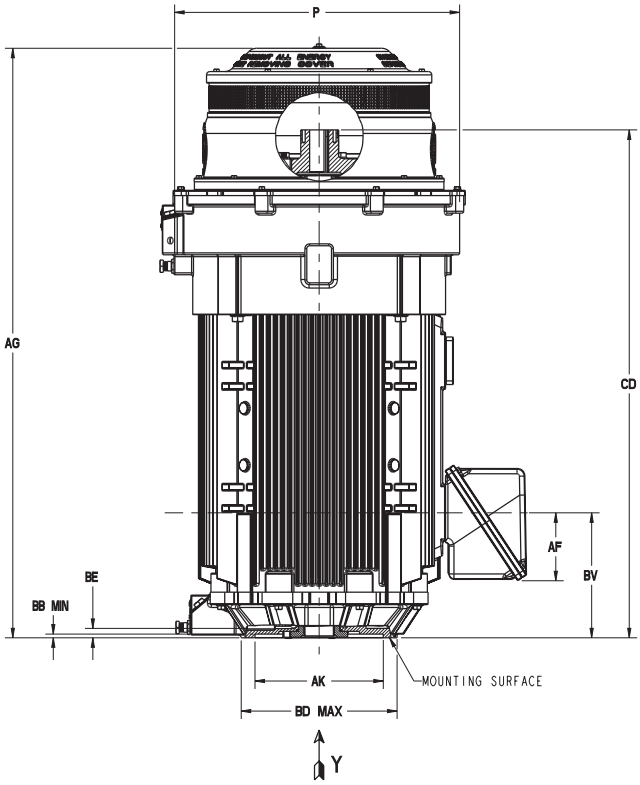
Ultra™ TEFC Vertical Hollow Shaft

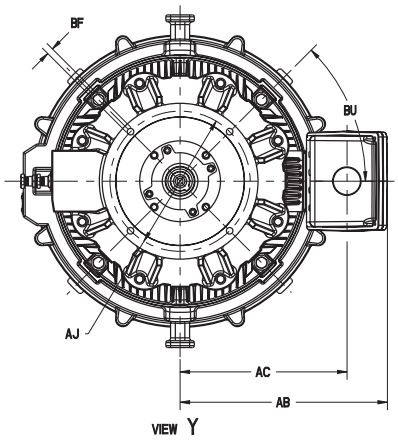
Inverter Duty with Bearing Fluting Protection
Totally Enclosed Fan Cooled (TEFC)
Premium Efficient
213 - 5013 Frame

Dimensions

Dimensions on next page

213 - 5013 Frame





Ultra™ TEFC Vertical Hollow Shaft

Inverter Duty with Bearing Fluting Protection
Totally Enclosed Fan Cooled (TEFC)
Premium Efficient
213 - 5013 Frame

Dimensions (cont.)

Dimensions refer to drawings on the previous page

Frame	Dimensions in Inches									
	P	AG	CD	AJ	AK	BD	BE	BF	BV	EO Min
210	13.16	23.70	18.88	9.125	8.25	10.00	0.77	0.438	8.59	4.00
250	15.64	28.32	23.38	9.125	8.25	10.00	0.77	0.438	10.75	4.69
280	17.56	30.60	25.68	9.125	8.25	10.00	0.77	0.438	12.00	2.50
				9.125	8.25	12.00		0.438		
				14.750	13.50	16.50		0.688		
320	21.80	38.80	31.39	9.125	8.25	12.00	0.88	0.438	11.96	4.00
				14.750	13.50	16.50		0.690		
360	24.15	42.11	32.99	9.125	8.25	12.00	0.48	0.440	12.58	4.00
				14.750	13.50	16.50	0.88	0.690		
400	27.75	47.59	39.93	14.750	13.50	16.50	1.06	0.690	16.41	4.50
444/445	31.50	55.00	45.94	14.750	13.50	16.50	0.99	0.690	13.16	5.00
						20.00				
						24.50				
447/449	31.50	62.47	53.44	14.750	13.50	16.50	0.99	0.690	13.16	5.00
						20.00				
						24.50				
509	40.24	66.39	56.50	14.750	13.50	20.00	1.40	0.690	12.00	9.18
				14.750	13.50	24.50		0.690		
				26.000	22.00	30.50		0.810		
5011	40.24	74.39	64.50	14.750	13.50	20.00	1.40	0.690	27.49	9.18
				14.750	13.50	24.50		0.690		
				26.000	22.00	30.50		0.810		
5013	40.24	83.39	73.50	14.750	13.50	20.00	1.40	0.690	31.99	9.18
				14.750	13.50	24.50		0.690		
				26.000	22.00	30.50		0.810		

Conduit Box Dimensions

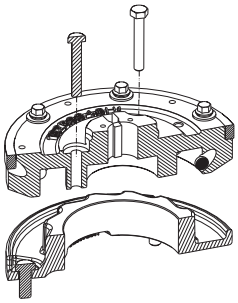
Frame	CBOX Size (ci)	AA	Dimensions in Inches				
			AB	AC	AF	XL	XN
210	55	1" - NPT	9.53	7.42	3.50	5.79	4.16
250	137	1-1/4" - NPT	12.15	9.12	4.59	7.38	5.38
280	137	1-1/2" - 11.5 NPT	12.91	9.88	4.59	7.38	5.38
320	346	3" - 8 NPT	16.07	12.37	6.44	10.15	7.00
360	346	3" - 8 NPT	17.07	13.36	6.44	10.15	7.00
	700	3" - 8 NPT	19.00	14.74	7.00	12.13	10.50
400	700	3" - 8 NPT	20.40	16.14	7.00	12.13	10.50
440	700	3" - 8 NPT	21.81	17.57	7.00	12.13	10.50
	1260	(2) 4" - 8 NPT	22.39	17.74	7.00	12.39	16.25
	2500	(2) 4" - 8 NPT	23.95	18.49	7.69	14.08	27.25
500	2500	(2) 3" - 8 NPT	25.40	19.94	14.20	22.70	12.00
	2500	(2) 4" - 8 NPT	25.40	19.94	14.20	22.70	12.00
	5700	(3) 3" - 8 NPT	29.44	21.94	10.87	23.24	22.25

Ultra™ TEFC Vertical Hollow Shaft

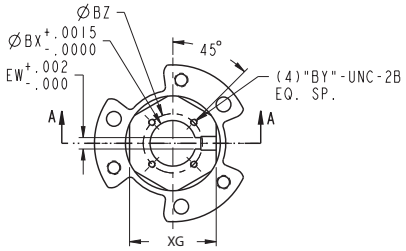
Totally Enclosed Fan Cooled (TEFC)
Premium Efficient
Ball Style Non-Reverse, Self-Release, Bolted

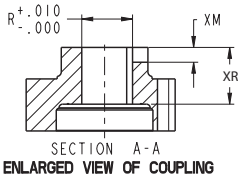
Kits and Accessories

213 - 286 Frame UHC Coupling and NRR Assembly



324 - 449 Upper Half Coupling





TEFC Ultra™ and Ultra+™ Couplings
HP: 5 - 300

Frame	Ball Type Non-Reverse Ratchet Cat. No.	Ball Type Non-Reverse Ratchet Part No.	Self-Release and Bolted Part No.			BX	Keyway Depth	Keyway Width	XG	BY	BZ	XM	XR
213/215	**Y8804**	192B9950EX-G04	4002B5521AB-G04			0.751	0.090	0.189	2.435	# 10-32	1.375	0.438	1.250
	Y8803	192B9950EX-G03	4002B5521AB-G03			0.876	0.125	0.250					
	Y8802	192B9950EX-G02	4002B5521AB-G02			0.939							
	Y8801	192B9950EX-G01	4002B5521AB-G01			1.001							
	Y8805	192B9950EX-G05	N/A			1.032							
254/256/ 284/286	**Y8813**	192B9950EZ-G08	4002B5525AB-G05			0.751	0.091	0.189	2.435	# 10-32	1.375	0.438	1.125
	Y8812	192B9950EZ-G07	4002B5525AB-G04			0.876	0.125	0.250					
	Y8811	192B9950EZ-G06	N/A			0.939							
	Y8810	192B9950EZ-G05	4002B5525AB-G03			1.001							
	Y8814	192B9950EZ-G09	N/A			1.032							
	Y8808	192B9950EZ-G03	N/A			1.066				1/4- 20 UNC	1.750		
	Y8809	192B9950EZ-G04	N/A			1.126							
	Y8807	192B9950EZ-G02	4002B5525AB-G02			1.189							
	Y8806	192B9950EZ-G01	4002B5525AB-G01			1.251							
	Y8815	192B9950EZ-G10	4002B5525AB-G07			1.251	0.188	0.375					

Frame Size	Cat. No.	Part No.			Dimension in Inches BX	Depth	EW	XG	BY	BZ	XM	XR
324/326	**Y8730**	192B9950FA-G21			1.000	0.118	0.250	3.243	1/4- 20 UNC	1.375	0.438	1.913
	Y8731	192B9950FA-G22			1.189	0.133				1.750		
	Y8732	192B9950FA-G23			1.250							
	Y8733	192B9950FA-G24			1.250	0.169	0.375			2.125		
	Y8734	192B9950FA-G25			1.438	0.172						
	Y8735	192B9950FA-G26			1.501							
364/365	**Y8730**	192B9950FA-G21			1.000	0.118	0.250	3.243	1/4- 20 UNC	1.375	0.438	1.913
	Y8731	192B9950FA-G22			1.188	0.134				1.750		
	Y8732	192B9950FA-G23			1.251							
	Y8733	192B9950FA-G24			1.251	0.169	0.375			2.125		
	Y8734	192B9950FA-G25			1.438	0.172						
	Y8735	192B9950FA-G26			1.501							
	Y8736	192B9950FA-G27			1.688	0.176						
404/405	**Y8741**	192B9950FC-G21			1.188	0.121	0.250	3.250	1/4- 20 UNC	1.750	0.562	2.413
	Y8742	192B9950FC-G22			1.251							
	Y8743	192B9950FC-G23			1.251	0.168	0.375			2.125		
	Y8744	192B9950FC-G24			1.438	0.172						
	Y8745	192B9950FC-G25			1.501							
	Y8746	192B9950FC-G26			1.688	0.176						
	Y8747	192B9950FC-G27			1.751					2.500		
444/445 and 447/449	**Y8765**	192B9950EH-G34			1.438	0.180	0.375	3.740	1/4- 20 UNC	2.125	0.688	4.452
	Y8755	192B9950EH-G02			1.501							
	Y8756	192B9950EH-G03			1.688					2.500		
	Y8758	192B9950EH-G05			1.813	0.230	0.500					
	Y8759	192B9950EH-G06			1.938							
	Y8762	192B9950EH-G09			2.126				3/8- 16 UNC	3.250		
	Y8751	192B9950EH-G10			2.188							
	Y8764	192B9950EH-G11			2.251							

320-500 Frame - "Standard" non-reverse coupling shipped with motor. For other sizes order from above list.

Stabilizer bushings for Ultra™ TEFC shown on page VP.23.

Ultra™ TEFC Vertical Hollow Shaft

Totally Enclosed Fan Cooled (TEFC)
Premium Efficient
Ball Style Non-Reverse, Self-Release, Bolted

Kits and Accessories (cont.)

P-Base Kits

Frame	BD Diameter	Kit Number
250	10	128D6129PA1
280	10	128D6229PD1
	12	128D6234AB1
	16	128D6234AA1
320	12	115E8204AA1
	16	115E8205AA1
360	12	115E8261AA1
	16	115E8258AA1
400	16	115E8306AA1
440	16	115E8660AA1
	20	115E8661AA1
	24	115E8662AA1

Ultra™ TEFC VSS NT

Vertical Solid Shaft Normal Thrust
Premium Efficiency
TEFC - Severe Duty

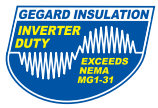
Standard Features

HP Range	3 - 75
Poles	2, 4
Voltage	230/460, 460, 575
Efficiency	NEMA Premium Efficiency
Frequency	60 Hz (Suitable for 50 Hz and 190/380V at 1.0 SF)
NEMA Design	B
Agency Approvals	UL - Component and Insulation System Recognition, CSA - Motors
Altitude	3300 ft
Ambient	40ºC
Balance/Vibration	Special Balance = 0.075 IPS
Bearing Caps	Yes
Bearing Protection	Shaft Slinger both ends, IP55
Bearing Type	Normal Thrust
Conduit Box	Cast Iron
Coupling	None
End Shield	Cast Iron
Fasteners	SAE
Frame Material	Cast Iron
Frame Size	182-365
Grease/Oil	Grease – Polyrex EM
Ground	Frame Ground Bolt and Brass Bolt in Conduit Box
Inverter Capabilities	Variable Torque 0-60 Hz at 1.0 SF
Insulation Class	H
Insulation System	GEGard 2400, Non-Hygroscopic, Anti-Fungus, Meets NEMA MG1-31 for variable frequency drives.
Lifting Means	Yes, integral bidirectional lifting posts
Mounting	Vertical P-Base
Nameplate	Stainless Steel
Paint	Buff Epoxyester
Relubrication	Yes
Rotor	Cast Aluminum
Service Factor	1.15
Shaft Dimensions	API 610 12th edition shaft dimensions
Space Heater	115 Volt, 60 Hz
Temperature Rise	80ºC @ 1.0 SF
Tests	NEMA Routine only
Time Rating	Continuous
Top Hat	Cast Iron Steel
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first



Ultra™ TEFC VSS NT

Vertical Solid Shaft Normal Thrust
Premium Efficiency
TEFC - Severe Duty





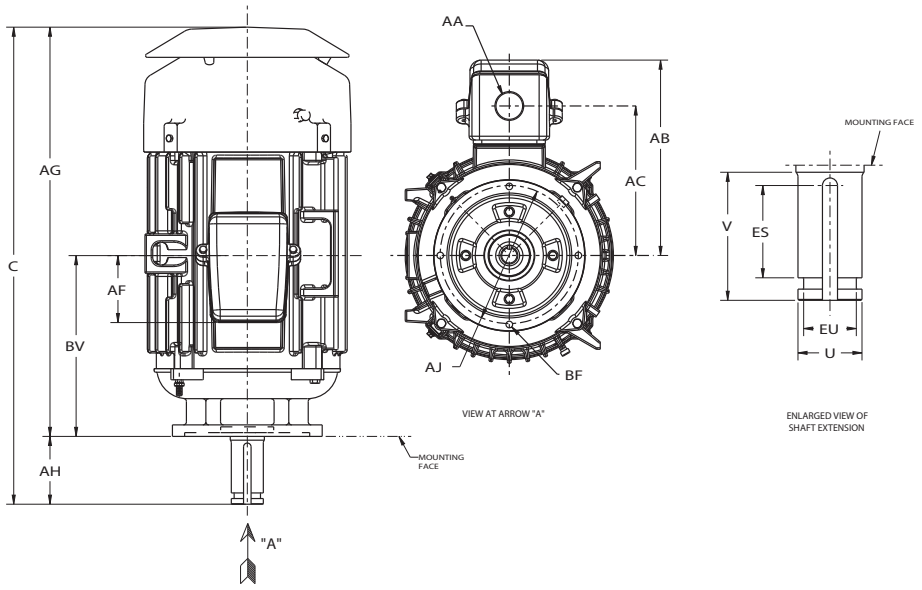
Normal Thrust
Volts: 230/460, 460, 575
HP: 3 - 75

HP	RPM	Volts	NEMA Frame	Cat. No.	Model No.	Normally Stocked	L10 Down Thrust (lbs) @ 8760 Hrs	Notes
3	3600	230/460	182HP10	**V960**	5KS182SAE123	N	522	
3	1800	230/460	182HP10	**V980**	5KS182SAE226	N	652	
5	3600	230/460	184HP10	**V961**	5KS184SAE120	N	522	
5	1800	230/460	184HP10	**V981**	5KS184SAE228	N	652	
5	1800	575	184HP10	**V918**	5KS184SAE204	N	652	
7.5	3600	230/460	213HP10	**V962**	5KS213SAE133	N	620	
7.5	1800	230/460	213HP10	**V982**	5KS213SAE230	N	772	
10	3600	230/460	215HP10	**V963**	5KS215SAE184	N	620	
10	1800	230/460	215HP10	**V983**	5KS215SAE226	N	772	
15	3600	230/460	254HP10	**V964**	5KS254SAE126	N	685	
15	1800	230/460	254HP10	**V984**	5KS254SAE225	N	856	
20	3600	230/460	256HP10	**V965**	5KS256SAE129	N	685	
20	1800	230/460	256HP10	**V985**	5KS256SAE225	N	856	
25	3600	230/460	284HP10	**V966**	5KS284SAE129	N	783	
25	1800	230/460	284HP10	**V986**	5KS284SAE222	N	968	
30	3600	230/460	286HP10	**V967**	5KS286SAE131	N	783	
30	1800	230/460	286HP10	**V987**	5KS286SAE222	N	968	
30	1200	460	326HP12	**V4967**	5KS326SAJ323	N	1,255	
30	1200	230/460	326HP16	**V4972**	5KS326SAJ305	N	1,255	
40	3600	460	324HP16	**V4968**	5KS324SAJ108	N	1,067	
40	1800	460	324HP16	**V4988**	5KS324SAJ208	N	1,294	
40	900	460	365HP16	**V4993**	5KS365SAJ420	N	1,233	
50	3600	460	326HP16	**V4969**	5KS326SAJ108	N	1,067	
50	1800	460	326HP16	**V4989**	5KS326SAJ208	N	1,294	
60	3600	460	364HP16	**V4970**	5KS364SAJ108	N	1,000	
60	1800	460	364HP16	**V4990**	5KS364SAJ208	N	1,205	
75	3600	460	365HP16	**V4971**	5KS365SAJ108	N	1,000	
75	1800	460	365HP16	**V4991**	5KS365SAJ208	N	1,205	

Ultra™ TEFC VSS NT

Vertical Solid Shaft Normal Thrust
Premium Efficiency
TEFC - Severe Duty
182 - 449 Frame

Dimensions



Normal Thrust

Frame	Shaft				Dimensions in Inches									
	ES Min	EU	U	V Min	C	AG	AH	BV	AF	AA	AB	AC	AJ	BF
L182/L184HP10	1.28	0.875	1.125	2.75	17.83	15.08	2.75	6.50	2.50	3/4" -14 NPT	8.76	6.68	9.125	0.438
L213/L215HP10	1.28	0.875	1.125	2.75	22.34	19.59	2.75	8.59	3.50	1 - NPT	9.53	7.42	9.125	0.438
L254/L256HP10	1.28	0.875	1.125	2.75	27.33	24.58	2.75	10.75	4.59	1.25 - NPT	11.4	9.12	9.125	0.438
L284/L286HP10	1.28	0.875	1.125	2.75	29.91	27.41	2.75	12.00	4.59	1.5 - NPT	12.91	9.88	9.125	0.438
L324/L326HP16	3.03	1.250	1.625	4.50	33.71	29.21	4.50	11.96	6.44	3" - 8 NPT	16.07	12.37	14.750	0.690
L364/L365HP16	3.03	1.250	1.625	4.50	36.68	32.18	4.50	12.58	6.44	3" - 8 NPT	17.07	13.36	14.750	0.690
L404/L405HP16	3.03	1.250	1.625	4.50	43.76	39.26	4.50	16.41	7.00	3" - 8 NPT	20.40	16.14	14.750	0.690
L444/L445HP16	3.03	1.750	2.125	4.50	45.53	41.03	4.50	15.80	7.00	3" - 8 NPT	21.81	17.55	14.750	0.690
L447/L449HP16/20	3.03	1.750	2.125	4.50	54.10	49.60	4.50	20.05	7.00	3" - 8 NPT	21.81	17.55	14.750	0.690

Notes

Tolerances:
AH: +/- 0.010”
U: + 0.000” ; - 0.005”
EU: + 0.000” ; - 0.005”

Ultra+™ Vertical Solid Shaft High Thrust (WPI)

Inverter Duty with Bearing Fluting Protection
Weather Protection I (WPI)
Premium Efficient

Standard Features

HP Range	10 - 500
Poles	4, 6
Voltage	460
Efficiency	NEMA Premium
Frequency	60 Hz (De-rated at 50 Hz and noted on the nameplate.)
NEMA Design	B
Agency Approvals	UL - Component and Insulation System Recognition, CSA - Motors
Altitude	3300 ft
Ambient	40ºC
Balance/Vibration	Special Balance = 0.075 IPS
Bearing Caps	Yes
Bearing Protection	Shaft Slinger
Bearing Type	High Thrust and Extra High Thrust
Conduit Box	Cast Iron
Coupling	Non-Reverse Standard
End Shield	Cast Iron
Fasteners	SAE
Finishing Varnish	Trickle Treat System
Frame Material	Cast Iron
Frame Size	215-509
Grease/Oil	All Guide and 213-286 Thrust Bearings: Polyrex EM, 324-509 Oil Lubricated Thrust Bearings: ISO 32
Ground	Brass Bolt on Frame and in Conduit Box
Insulation Class	H
Insulation System	GEGARD2400, Non-Hygroscopic, Anti-Fungus, 2400 Volt at .1 microsecond rise time, Exceeds NEMA MG1-31 for variable frequency drives
Inverter Capabilities	Variable Torque 5-60 Hz w/NRR
Lifting Means	Yes, Integral to Endshield
Mounting	Vertical P-Base
Nameplate	Stainless Steel
Non-Reverse Ratchet Type	Ball Style
Paint	Epoxyester
Relubrication	Yes
Rotor	Cast Aluminum
Service Factor	1.15
Shaft Grounding	210-405 Frame: Aegis SGR on DE, 444 Frame and up: Aegis SGR on DE and Insulated Bearing Carrier on ODE
Space Heater	115 Volt, 60 Hz
Temperature Rise	80ºC @ 1.0 SF
Tests	NEMA Routine only
Thermostats	Includes NC Winding Thermostats
Time Rating	Continuous
Top Hat	Cast Aluminum
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first

Ultra+™ Vertical Solid Shaft High Thrust (WPI)

Inverter Duty with Bearing Fluting Protection
Weather Protection I (WPI)
Premium Efficient

HP: 10 - 500

HP	RPM	Volts	Frame	Thrust Down (lbs)	Motor Cat. No.	Model No.	Normally Stocked	Notes
10	1800	460	L215VP10	2,071	**V5001**	5KS215DAE6429	N	110, 113, 132
10	1200	460	L256VP10	2,960	**V5019**	5KS256DAE7426	N	110, 113, 132
20	1800	460	L256VP10	2,574	**V5002**	5KS256DAE6426	N	110, 113, 132
20	1200	460	L286VP10	3,380	**V5020**	5KS286DAE7424	N	110, 113, 132, 166
25	1800	460	L284VP10	2,959	**V5003**	5KS284DAE6442	N	110, 113, 132, 166
25	1200	460	L324VP12	7,177	**V5021**	5KS324DAJ7421	N	110, 113, 132
30	1800	460	L286VP10	2,959	**V5004**	5KS286DAE6437	N	110, 113, 132, 166
30	1200	460	L326VP12	7,178	**V5022**	5KS326DAJ7420	N	110, 113, 132
40	1800	460	L324VP12	6,320	**V5005**	5KS324DAJ6437	N	110, 113, 132
40	1200	460	L364VP16	7,077	**V5023**	5KS364DAJ7424	N	110, 113, 132, 167
50	1800	460	L326VP12	6,320	**V5006**	5KS326DAJ6439	N	110, 113, 132
50	1200	460	L365VP16	7,077	**V5024**	5KS365DAJ7428	N	110, 113, 132, 167
60	1800	460	L364VP16	6,243	**V5007**	5KS364DAJ6431	N	110, 113, 132, 167
60	1200	460	L404VP16	8,538	**V5025**	5KS404DAJ7423	N	110, 113, 132, 163
75	1800	460	L365VP16	6,244	**V5008**	5KS365DAJ6445	N	110, 113, 132, 167
75	1200	460	L405VP16	8,538	**V5026**	5KS405DAJ7426	N	110, 113, 132, 163
100	1800	460	L404VP16	7,539	**V5009**	5KS404DAJ6453	N	110, 113, 132, 163
100	1200	460	L444VP16	16,083	**V5027**	5KS444DAJ7427	N	110, 114, 132, 163
125	1800	460	L405VP16	7,539	**V5015**	5KS405DAJ6443	N	110, 114, 132, 163
125	1200	460	L445VP16	16,083	**V5028**	5KS445DAJ7427	N	110, 114, 132, 163
150	1800	460	L444VP16	14,461	**V5011**	5KS444DAJ6450	N	110, 114, 132, 163
150	1200	460	L445VP16	16,083	**V5029**	5KS445DAJ7428	N	110, 114, 132, 163
200	1800	460	L444VP16	14,461	**V5012**	5KS444DAJ6451	N	110, 114, 132, 163
200	1200	460	L447VP16	15,726	**V5030**	5KS447DAJ7430	N	110, 114, 132, 163
250	1800	460	L445VP20	14,462	**V5013**	5KS445DAJ6448	N	110, 114, 132, 164
250	1200	460	L447VP16	15,726	**V5031**	5KS447DAJ7431	N	110, 114, 132, 164
300	1800	460	L447VP20	14,188	**V5014**	5KS447DAJ6443	N	110, 114, 132, 164
300	1200	460	L449VP16	15,725	**V5032**	5KS449DAJ7430	N	110, 114, 132, 164
350	1800	460	L449VP20	14,188	**V5010**	5KS447DAJ6444	N	110, 114, 132, 164
350	1200	460	B509VP20	16,433	**V5033**	5KS509DAJ7427	N	110, 114, 132, 165

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
113 Aegis Shaft Grouding ring on bearing cap
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap
132 Includes NC Winding Thermostats
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
166 137 cubic inch conduit box
167 346 cubic inch conduit box

Ultra+™ Vertical Solid Shaft High Thrust (WPI)

Inverter Duty with Bearing Fluting Protection
Weather Protection I (WPI)
Premium Efficient

HP: 10 - 500

HP	RPM	Volts	Frame	Thrust Down (lbs)	Motor Cat. No.	Motor Model No.	Normally Stocked	Notes
400	1800	460	L449VP20	14,187	**V5016**	5KS449DAJ6454	N	110, 114, 132, 165
400	1200	460	B5011VP20	15,850	**V5034**	5KS511DAJ7431	N	110, 114, 132, 165
450	1800	460	L449VP20	14,187	**V5017**	5KS449DAJ6455	N	110, 114, 132, 165
450	1200	460	B5013VP20	15,267	**V5035**	5KS513DAJ7423	N	110, 114, 132, 165
500	1800	460	B509VP20	13,984	**V5018**	5KS509DAJ6444	N	110, 114, 132, 165
500	1200	460	B5013VP20	8,689	**V5036**	5KS513DAJ7424	N	110, 114, 132, 165

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
113 Aegis Shaft Grouding ring on bearing cap
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap
132 Includes NC Winding Thermostats
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
166 137 cubic inch conduit box
167 346 cubic inch conduit box

Ultra™ TEFC Vertical Solid Shaft High Thrust

Inverter Duty with Bearing Fluting Protection
Totally Enclosed Fan Cooled (TEFC)
Premium Efficient

Standard Features

HP Range	10 - 500
Poles	4, 6
Voltage	460
Efficiency	NEMA Premium
Frequency	60 Hz (De-rated at 50 Hz and noted on the nameplate.)
NEMA Design	B
Agency Approvals	UL - Component and Insulation System Recognition, CSA - Motors
Altitude	3300 ft
Ambient	40ºC
Balance/Vibration	0.075 in/sec max
Bearing Caps	Cast Iron and Sealed
Bearing L10 Life	Direct Coupled - 50,000 hrs
Bearing Protection	IP55, 182-286: Non-contact rotating labyrinth seal on both ends; 324-445: Non-contact rotating labyrinth seal DE
Bearing Type	Guide Bearing: Deep Groove Ball Bearing; Thrust Bearing: Angular Contact or Spherical Roller
Conduit Box	Cast Iron, Gasketed and Rotatable in 90 degree increments
Coupling	Non-Reverse
Drains	Stainless Steel T-drain
End Shield	Cast Iron
Fan	Non-Sparking Plastic or Bronze
Fan Cover	Cast Iron
Fasteners	SAE Grade 5
Frame Material	Cast Iron
Frame Size	215-5013
Grease/Oil	All Guide and 182-286 Thrust Bearings: Polyurea 324-5013 Upper Thrust Bearings: Oil
Ground	Ground Lug in Conduit Box and Frame Ground
Insulation Class	H
Insulation System	GEGARD2400, Non-Hygroscopic, Anti-Fungus, 2400 Volt at .1 microsecond rise time, Exceeds NEMA MG1-31 for variable frequency drives
Inverter Capabilities	Inverter Duty, 5-60 Hz Variable Torque, Suitable for PWM Operation
Lifting Means	4 Lugs Cast In Frames
Mounting	Vertical P-Base
Mounting Holes	Per NEMA
Nameplate	316 Stainless Steel
Paint	Epoxyester
Relubrication	Yes
Rotor	Cast Aluminum
Service Factor	1.15
Temperature Rise	80°C @ 1.0 SF
Tests	NEMA Routine only
Time Rating	Continuous
Top Hat	Cast Iron
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first

Ultra™ TEFC Vertical Solid Shaft High Thrust

Inverter Duty with Bearing Fluting Protection
Totally Enclosed Fan Cooled (TEFC)
Premium Efficient

HP: 10 - 500

HP	RPM	Volts	Frame	Thrust Down (lbs)	Motor Cat. No.	Motor Model No.	Normally Stocked	Notes
10	1800	460	L215VP10	2,071	**V4876**	5KS215SAE6431	N	110, 113, 132
10	1200	460	L256VP10	2,958	**V4894**	5KS256SAE7427	N	110, 113, 132
20	1800	460	L256VP10	2,574	**V4877**	5KS256SAE6448	N	110, 113, 132
20	1200	460	L286VP10	3,379	**V4895**	5KS286SAE7433	N	110, 113, 132, 163
25	1800	460	L284VP10	2,959	**V4878**	5KS284SAE6454	N	110, 113, 132
25	1200	460	L324VP12	7,177	**V4896**	5KS324SAJ7424	N	110, 113, 132
30	1800	460	L286VP10	2,959	**V4879**	5KS286SAE6461	N	110, 113, 132, 163
30	1200	460	L326VP12	7,178	**V4897**	5KS326SAJ7428	N	110, 113, 132
40	1800	460	L324VP12	6,320	**V4880**	5KS324SAJ6442	N	110, 113, 132
40	1200	460	L364VP16	7,077	**V4898**	5KS364SAJ7425	N	110, 113, 132, 167
50	1800	460	L326VP12	6,320	**V4881**	5KS326SAJ6438	N	110, 113, 132
50	1200	460	L365VP16	7,078	**V4899**	5KS365SAJ7426	N	110, 113, 132, 167
60	1800	460	L364VP16	6,243	**V4882**	5KS364SAJ6437	N	110, 113, 132, 167
60	1200	460	L404VP16	8,540	**V4903**	5KS404SAJ7431	N	110, 113, 132, 163
75	1800	460	L365VP16	6,244	**V4883**	5KS365SAJ6457	N	110, 113, 132, 167
75	1200	460	L405VP16	8,540	**V4904**	5KS405SAJ7428	N	110, 113, 132, 163
100	1800	460	L405VP16	7,539	**V4884**	5KS405SAJ6464	N	110, 113, 132, 163
100	1200	460	L444VP16	16,083	**V4905**	5KS444SAJ7429	N	110, 114, 132, 163
125	1800	460	L444VP16	14,461	**V4885**	5KS444SAJ6459	N	110, 114, 132, 163
125	1200	460	L445VP16	16,083	**V4906**	5KS445SAJ7434	N	110, 114, 132, 163
150	1800	460	L444VP16	14,462	**V4886**	5KS445SAJ6460	N	110, 114, 132, 163
150	1200	460	L447VP16	15,726	**V4907**	5KS447SAJ7428	N	110, 114, 132, 163
200	1800	460	L447VP16	14,188	**V4887**	5KS447SAJ6442	N	110, 114, 132, 163
200	1200	460	L449VP16	15,725	**V4908**	5KS449SAJ7439	N	110, 114, 132, 163
250	1800	460	L449VP16	14,188	**V4888**	5KS449SAJ6475	N	110, 114, 132, 164
250	1200	460	B509VP20	13,780	**V4909**	5KS509SAJ7423	N	110, 114, 132, 164
300	1800	460	L449VP16	14,188	**V4889**	5KS449SAJ6476	N	110, 114, 132, 164
300	1200	460	B509VP20	13,780	**V4910**	5KS509SAJ7424	N	110, 114, 132, 164
350	1800	460	B509VP20	12,142	**V4890**	5KS509SAJ6436	N	110, 114, 132, 164
350	1200	460	B5011VP20	13,500	**V4911**	5KS511SAJ7427	N	110, 114, 132, 168

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
113 Aegis Shaft Grouding ring on bearing cap
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap
132 Includes NC Winding Thermostats
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
167 346 cubic inch conduit box
168 2500 cubic inch conduit box 2-3" NPT

Ultra™ TEFC Vertical Solid Shaft High Thrust

Inverter Duty with Bearing Fluting Protection
Totally Enclosed Fan Cooled (TEFC)
Premium Efficient

HP: 10 - 500

HP	RPM	Volts	Frame	Thrust Down (lbs)	Motor Cat. No.	Motor Model No.	Normally Stocked	Notes
400	1800	460	B509VP20	12,142	**V4891**	5KS509SAJ6437	N	110, 114, 132, 168
400	1200	460	B5013VP20	13,000	**V4912**	5KS513SAJ7430	N	110, 114, 132, 168
450	1800	460	B5011VP20	12,000	**V4892**	5KS511SAJ6433	N	110, 114, 132, 168
450	1200	460	B5013VP20	13,000	**V4913**	5KS513SAJ7431	N	110, 114, 132, 168
500	1800	460	B5011VP20	11,634	**V4893**	5KS511SAJ6432	N	110, 114, 132, 168

Notes:

110 Usable on 380 volts, 50 Hz at 1.0 Service Factor and derated to next lower HP
113 Aegis Shaft Grouding ring on bearing cap
114 Insulated Upper Bearing Carrier and Aegis Shaft Grounding ring on bearing cap
132 Includes NC Winding Thermostats
163 700 cubic inch conduit box
164 1260 cubic inch conduit box
167 346 cubic inch conduit box
168 2500 cubic inch conduit box 2-3" NPT

XSD Ultra 841 VSS

Vertical Solid Shaft Inline Pump and High Thrust
TEFC - 841 - Extra Severe Duty

Standard Features



HP Range	3 - 400
Poles	2, 4
Voltage	460, 575
Agency Approvals	UL - Component and Insulation System Recognition, CSA - Motors
Altitude	3300 ft
Ambient	40ºC
Balance/Vibration	0.075 in/sec max
Bearing Caps	Cast Iron and Sealed
Bearing Protection	IP55, 182-286: Non-contact rotating labyrinth seal on both ends; 324-445: Non-contact rotating labyrinth seal DE
Bearing Type	Guide Bearing: Deep Groove Ball Bearing; Thrust Bearing: Double Row Angular Contact Ball Bearing
Conduit Box	Cast Iron, Gasketed and Rotatable in 90 degree increments
Coupling	Not available on this product construction
Div 2 Temp Codes	Motors have a AIT of 200 degrees C stamped on nameplates
Drains	Stainless Steel T-drain
Efficiency	NEMA Premium
End Shield	Cast Iron
Fan	Non-Sparking Plastic or Bronze
Fan Cover	Cast Iron
Fasteners	SAE Grade 5
Frame Material	Cast Iron
Frame Size	182-445
Frequency	60 Hz (De-rated at 50 Hz and noted on the nameplate)
Grease/Oil	All Guide and 182-286 Thrust Bearings: Polyurea 324-445 Upper Thrust Bearings: Oil
Ground	Ground lug in Conduit box and Frame Ground
Insulation Class	H
Insulation System	GEGARD2400, Non-Hygroscopic, Anti-Fungus, 2400 Volt at .1 microsecond rise time, Exceeds NEMA MG1-31 for variable frequency drives
Inverter Capabilities	Inverter duty, INF:1 Variable torque, Suitable for PWM Operation
Bearing L10 Life	Direct Coupled - 50,000 hrs
Lifting Means	4 lugs cast in frames
Mounting	Vertical P-Base
Mounting Holes	Per NEMA
Nameplate	316 Stainless Steel
NEMA Design	B
Paint	Buff, Epoxyester
Shaft Dimensions	API 610 12th edition shaft dimensions
Special Painting	Meets IEEE841
Relubrication	Yes
Rotor	Cast Aluminum
Service Factor	1.15
Temperature Rise	80ºC @ 1.0 SF
Tests	NEMA Routine only
Time Rating	Continuous
Top Hat	Cast Iron
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first

XSD Ultra 841 VSS

Vertical Solid Shaft Inline Motor
TEFC - 841 - Extra Severe Duty
NEMA Premium



Inline Pump
Volts: 460, 575
HP: 3 - 25

HP	RPM	Volts	NEMA Frame	Cat. No.	Model No.	Normally Stocked	L10 Down Thrust (lbs) @ 8,760 Hrs	L10 Down Thrust (lbs) @ 26,280 Hrs	Notes
3	3600	460	L182LP10	**V768**	5KS182XAE5723	Y	752	516	
3	1800	460	L182LP10	**V780**	5KS182XAE6722	Y	752	516	
3	1200	460	L213LP10	**V4854**	5KS213XAE7721	N	1,090	755	
5	3600	460	L184LP10	**V769**	5KS184XAE5724	Y	752	516	
5	1800	460	L184LP10	**V781**	5KS184XAE6722	Y	752	516	
5	1200	460	L215LP10	**V4856**	5KS215XAE7721	N	1,090	755	
7.5	3600	460	L213LP10	**V770**	5KS213XAE5724	Y	758	516	
7.5	1800	460	L213LP10	**V782**	5KS213XAE6722	Y	758	516	
7.5	1200	460	L254LP10	**V4858**	5KS254XAE7720	N	1,284	890	
10	3600	460	L215LP10	**V771**	5KS215XAE5721	Y	758	516	
10	1800	460	L215LP10	**V783**	5KS215XAE6721	Y	758	516	
10	1200	460	L256LP10	**V4860**	5KS256XAE7720	N	1,284	890	
15	3600	460	L254LP10	**V772**	5KS254XAE5722	Y	910	612	
15	1800	460	L254LP10	**V784**	5KS254XAE6727	Y	1,140	764	
15	1200	460	L284LP10	**V4862**	5KS284XAE7720	N	1,427	990	
20	3600	460	L256LP10	**V773**	5KS256XAE5725	Y	910	612	
20	1800	460	L256LP10	**V785**	5KS256XAE6721	Y	1,140	764	
20	1200	460	L286LP10	**V4864**	5KS286XAE7721	N	1,427	990	
25	3600	460	L284LP10	**V774**	5KS284XAE5721	Y	1,057	705	
25	1800	460	L284LP10	**V786**	5KS284XAE6720	Y	1,313	870	
25	1200	460	L324LP16	**V4865**	5KS324XAJ7721	N	6,361	4,415	
30	3600	460	L286LP10	**V775**	5KS286XAE5722	Y	1,057	705	
30	1800	460	L286LP10	**V787**	5KS286XAE6722	Y	1,313	870	
40	3600	460	L324LP16	**V4801**	5KS324XAJ5708	Y	1,963	1,323	
40	1800	460	L324LP16	**V4802**	5KS324XAJ6708	Y	5,553	3,791	
40	1200	460	L364LP16	**V4866**	5KS364XAJ7721	N	6,961	4,831	
50	3600	460	L326LP16	**V4803**	5KS326XAJ5708	Y	1,963	1,323	
50	1800	460	L326LP16	**V4804**	5KS326XAJ6708	Y	5,553	3,791	
50	1200	575	L365LP16	**V4868**	5KS365XAJ7721	N	6,260	4,345	
60	3600	460	L364LP16	**V4805**	5KS364XAJ5708	Y	3,768	2,555	
60	1800	460	L364LP16	**V4806**	5KS364XAJ6708	Y	5,473	3,711	
75	3600	460	L365LP16	**V4807**	5KS365XAJ5708	Y	3,768	2,555	
75	1800	460	L365LP16	**V4808**	5KS365XAJ6708	Y	5,473	3,711	
75	1200	575	L405LP16	**V4870**	5KS405XAJ7720	N	7,310	5,073	

XSD Ultra 841 VSS

Vertical Solid Shaft Inline Motor
TEFC - 841 - Extra Severe Duty
NEMA Premium



Inline Pump
Volts: 460, 575
HP: 3 - 250

HP	RPM	Volts	NEMA Frame	Cat. No.	Model No.	Normally Stocked	L10 Down Thrust (lbs) @ 8,760 Hrs	L10 Down Thrust (lbs) @ 26,280 Hrs	Notes
100	3600	460	L405LP16	**V4809**	5KS405XAJ5708	Y	3,715	2,501	
100	1800	460	L405LP16	**V4810**	5KS405XAJ6708	Y	6,414	4,320	
125	3600	460	L444LP16	**V4811**	5KS444XAJ5708	N	3,901	2,578	
125	1800	460	L444LP16	**V4812**	5KS444XAJ6708	N	12,856	9,529	
150	3600	460	L445LP16	**V4813**	5KS445XAJ5708	Y	3,901	2,578	
150	1800	460	L445LP16	**V4814**	5KS445XAJ6708	Y	12,856	9,529	
200	1800	460	L447LP20	**V4872**	5KS447XAJ6721	N	4,864	–	
250	1800	460	L449LP24	**V4832**	5KS449XAJ6720	N	4,864	–	

XSD Ultra 841 VSS

Vertical Solid Shaft High Thrust
TEFC - 841 - Extra Severe Duty
NEMA Premium



High Thrust
Volts: 460
HP: 3 - 400

HP	RPM	NEMA Frame	Cat. No.	Model No.	Normally Stocked	L10 Down Thrust (lbs) @ 8,760 Hrs	L10 Down Thrust (lbs) @ 26,280 Hrs	Notes
3	3600	L182VP10	**V854**	5KS182XAE5420	N	1,226	845	
3	1800	L182VP10	**V868**	5KS182XAE6421	N	1,912	1,320	
3	1200	L213VP10	**V4853**	5KS213XAE7420	N	2,223	1,535	
5	3600	L184VP10	**V853**	5KS184XAE5422	N	1,226	850	
5	1800	L184VP10	**V867**	5KS184XAE6421	N	1,539	1,060	
5	1200	L215VP10	**V4855**	5KS215XAE7420	N	2,223	1,535	
7.5	3600	L213VP10	**V855**	5KS213XAE5422	N	1,543	1,060	
7.5	1800	L213VP10	**V866**	5KS213XAE6423	N	1,936	1,330	
7.5	1200	L254VP10	**V4857**	5KS254XAE7420	N	2,697	1,850	
10	3600	L215VP10	**V856**	5KS215XAE5421	N	1,543	1,060	
10	1800	L215VP10	**V865**	5KS215XAE6422	N	1,936	1,330	
10	1200	L256VP10	**V4859**	5KS256XAE7420	N	2,697	1,850	
15	3600	L254VP10	**V857**	5KS254XAE5424	N	1,867	1,280	
15	1800	L254VP10	**V864**	5KS254XAE6422	N	2,346	1,600	
15	1200	L284VP10	**V4861**	5KS284XAE7420	N	3,256	2,200	
20	3600	L256VP10	**V858**	5KS256XAE5420	N	1,867	1,280	
20	1800	L256VP10	**V863**	5KS256XAE6422	N	2,346	1,600	
20	1200	L286VP10	**V4863**	5KS286XAE7420	N	3,256	2,200	
25	3600	L284VP10	**V859**	5KS284XAE5425	N	2,278	1,550	
25	1800	L284VP10	**V862**	5KS284XAE6421	N	2,852	1,940	
30	3600	L286VP10	**V860**	5KS286XAE5423	N	2,278	1,550	
30	1800	L286VP10	**V861**	5KS286XAE6429	N	2,852	1,930	
40	3600	L324VP16	**V4815**	5KS324XAJ5408	N	4,411	3,013	
40	1800	L324VP16	**V4816**	5KS324XAJ6408	N	5,553	3,791	
50	3600	L326VP16	**V4817**	5KS326XAJ5408	N	4,411	3,019	
50	1800	L326VP12	**V4831**	5KS326XAJ6424	N	5,553	3,791	
50	1800	L326VP16	**V4818**	5KS326XAJ6408	Y	5,553	3,791	
50	1200	L365VP16	**V4867**	5KS365XAJ7420	N	6,261	4,339	
60	3600	L364VP16	**V4819**	5KS364XAJ5408	N	4,363	2,965	
60	1800	L364VP16	**V4820**	5KS364XAJ6408	N	5,473	3,711	
75	3600	L365VP16	**V4821**	5KS365XAJ5408	Y	4,363	2,965	
75	1800	L365VP16	**V4822**	5KS365XAJ6408	Y	5,473	3,711	
75	1200	L405VP16	**V4869**	5KS405XAJ7421	N	7,308	4,910	
100	1800	L405VP16	**V4824**	5KS405XAJ6408	Y	6,402	4,308	

XSD Ultra 841 VSS

Vertical Solid Shaft High Thrust
TEFC - 841 - Extra Severe Duty
NEMA Premium



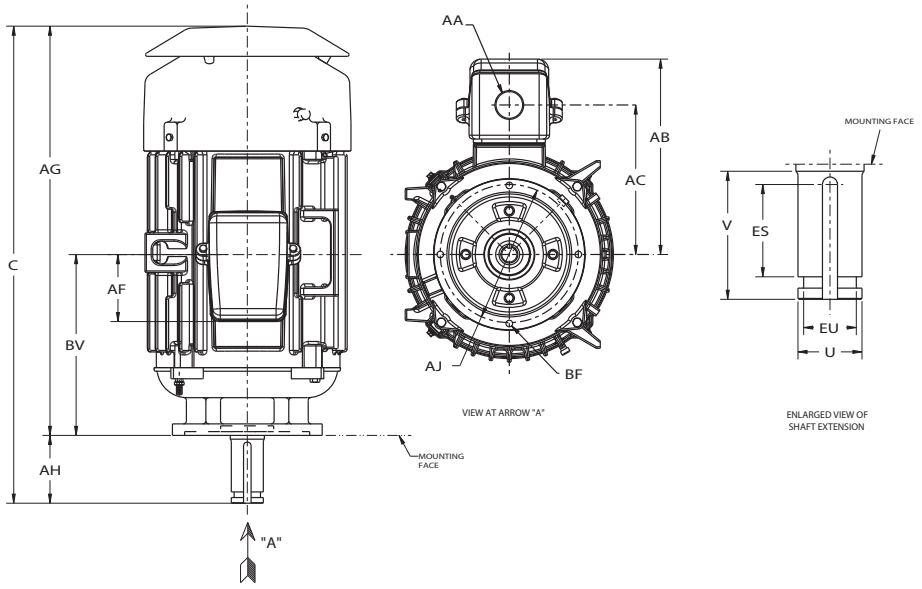
High Thrust
Volts: 460
HP: 3 - 400

HP	RPM	NEMA Frame	Cat. No.	Model No.	Normally Stocked	L10 Down Thrust (lbs) @ 8,760 Hrs	L10 Down Thrust (lbs) @ 26,280 Hrs	Notes
125	3600	L444VP16	**V4825**	5KS444XAJ5408	N	8,709	5,800	
125	1800	L444VP16	**V4826**	5KS444XAJ6408	N	11,548	7,790	
125	1200	L445VP16	**V4873**	5KS445XAJ7408	N	21,980	14,955	
150	3600	L445VP16	**V4827**	5KS445XAJ5408	N	8,709	5,910	
150	1800	L445VP16	**V4828**	5KS445XAJ6408	N	11,548	7,790	
200	3600	L447VP20	**V4829**	5KS447XAJ5408	N	8,564	5,765	
200	1800	L447VP20	**V4830**	5KS447XAJ6408	N	11,247	7,520	
300	1200	B5011VP30	**V4874**	5KS511XAJ7423	N	12,221	8,474	
400	1800	B509VP30	**V4875**	5KS509XAJ6420	N	12,400	8,556	

XSD Ultra 841 VSS

Vertical Solid Shaft Inline Pump and High Thrust
TEFC - 841 - Extra Severe Duty
182 - 449 Frame

Dimensions



Inline Pump

Frame	Shaft Extension				Dimensions in Inches									
	ES Min	EU	U	V Min	C	AG	AH	BV	AF	AA	AB	AC	AJ	BF
L182/L184LP	1.28	0.875	1.125	2.50	18.17	15.42	2.75	6.50	2.89	1 - NPT	8.76	6.68	9.125	0.438
L213/L215LP	1.28	1.250	1.625	2.75	22.34	19.59	2.75	8.59	3.50	1 - NPT	9.53	7.42	9.125	0.438
L254/L256LP	1.28	1.250	1.625	2.75	27.33	24.58	2.75	10.75	4.59	1.25 - NPT	12.15	9.12	9.125	0.438
L284/L286LP	3.00	1.750	2.125	4.25	31.66	27.16	4.50	12.00	4.59	1.5 - NPT	12.91	9.88	9.125	0.438
L324/L326LP	3.03	1.750	2.125	4.50	43.10	38.60	4.50	11.96	6.44	3" - 8 NPT	16.07	12.36	14.750	0.690
L364/L365LP	3.03	1.750	2.125	4.50	46.61	42.11	4.50	12.58	6.44	3" - 8 NPT	17.07	13.36	14.750	0.690
L404/L405LP	3.03	1.750	2.125	4.50	52.09	47.59	4.50	16.41	7.00	3" - 8 NPT	20.40	16.14	14.750	0.690
L444/L445LP	3.03	1.750	2.125	4.50	59.50	55.00	4.50	13.16	7.00	3" - 8 NPT	21.81	17.55	14.750	0.690
L447/L449LP	3.03	1.750	2.125	4.50	67.00	62.50	4.50	13.16	7.00	(2) 4" - 8 NPT	22.50	17.74	14.750	0.690

High Thrust

Frame	Shaft Extension				Dimensions in Inches									
	ES Min	EU	U	V Min	C	AG	AH	BV	AF	AA	AB	AC	AJ	BF
L182/L184VP	1.28	0.875	1.125	2.50	18.17	15.42	2.75	6.50	2.89	1 - NPT	8.76	6.68	9.125	0.438
L213/L215VP	1.28	0.875	1.125	2.75	22.34	19.59	2.75	8.59	3.50	1 - NPT	9.53	7.42	9.125	0.438
L254/L256VP	1.28	0.875	1.125	2.75	27.33	24.58	2.75	10.75	4.59	1.25 - NPT	12.15	9.12	9.125	0.438
L284/L286VP	1.28	0.875	1.125	2.75	29.92	27.16	2.75	12.00	4.59	1.5 - NPT	12.91	9.88	9.125	0.438
L324/L326VP	3.03	1.250	1.625	4.50	43.10	38.60	4.50	11.96	6.44	3" - 8 NPT	16.07	12.36	14.750	0.690
L364/L365VP	3.03	1.250	1.625	4.50	46.61	42.11	4.50	12.58	6.44	3" - 8 NPT	17.07	13.36	14.750	0.690
L404/L405VP	3.03	1.250	1.625	4.50	52.09	47.59	4.50	16.41	7.00	3" - 8 NPT	20.40	16.14	14.750	0.690
L444/L445VP	3.03	1.750	2.125	4.50	59.50	55.00	4.50	13.16	7.00	3" - 8 NPT	21.81	17.55	14.750	0.690
L447/L449VP	3.03	1.750	2.125	4.50	67.00	62.50	4.50	13.16	7.00	3" - 8 NPT	21.81	17.55	14.750	0.690

Note

Tolerances:

AH: +/- 0.010"
U: + 0.000" ; - 0.005"
EU: + 0.000" ; - 0.005"

XSD Ultra 841 VSS

Vertical Solid Shaft Inline Pump and High Thrust
TEFC - 841 - Extra Severe Duty
182 - 449 Frame

Kits and Accessories

P-Base Kits

Frame	Enclosure	BD Diameter	Kit Number
280	841 INLINE	10	128D6229PM1
	841 INLINE	16	128D6230PF1
	841 VSS-HT	10	128D6229PH1
	841 VSS-HT	16	128D6230PE1
320	841 IL & HT	12	115E8204AC1
	841 IL & HT	16	115E8205AC1
360	841 IL & HT	12	115E8261AC1
	841 IL & HT	16	115E8258AC1
400	841 IL & HT	16	115E8306AC1
440	841 IL & HT	16	115E8660AA1
	841 IL & HT	20	115E8661AA1
	841 IL & HT	24	115E8662AA1

XSD Ultra 841 Vertical C-Face NT

TEFC—Extra Severe Duty (IP56)

Standard Features



NEMA Frame Size	143 - 365
Poles	2, 4 & 6
Horsepower Range	2-pole - 1 - 75 4-pole - 1 - 75 6-pole - 1.5 - 50
Voltage	460
Shaft Extension	2-pole 143 - 286 fr - T 284 - 365 fr - TS 4 & 6-pole 4P: 143 - 365, 6P: 182 - 326 - T
Agency Approvals	UL - Component and Insulation System Recognition CSA - Certification and Efficiency Verification
Industry Specifications	IEEE 841, IEEE 45 Marine Duty
Warranty (months)	60 months from date of installation or 66 months from date of manufacture, whichever occurs first
Max Ambient & Altitude	40˚C & 3300 feet
Insulation Class	H
Winding Temperature Rise	80C @1.0SF Sine wave (with some high end exceptions)
Service Factor	1.15 Sine wave (with some high end exceptions)
Bearing Housing Rise	Per IEEE 841 - 2-pole - 50C 4 & 6-pole - 45C
Division 2 Temperature Code	CSA Certified Div 2, T3 (200 C) (with some high end exceptions)
NEMA Design	B
Insulation System	Non-Hygroscopic, Anti-Fungus, Polyester Resin, Trickle Treated, Tested to Exceed NEMA MG 1 Part 31
Inverter Capability	Variable Torque INF:1
Efficiency	Per IEEE 841 (NEMA Premium 1-300 HP)
Frame Material	Cast iron
Frame/Conduit Box Gasket	Neoprene Rubber
Frame/End Shield Seal	Yes
End Shield Material	Cast Iron
Conduit Box Material	Cast Iron or Fabricated Steel Plate
Conduit Box Cover Gasket	Neoprene Rubber
Conduit Box Rotation	90 degree increments
Conduit Box Hole Thread	NPT
Shaft Runout	Per IEEE 841
Fan Cover Material	Cast Iron
Fan	2-pole - Bi-Directional, Non-sparking Plastic (except Uni-directional Aluminum in 449 frame) 4 & 6-pole - Bi-Directional, Non-sparking Plastic
Sound Power	90 dBA sound power (with some high end exceptions)
Mounting	W6, Shaft Down with C-Face Flange
Mounting Holes	Per NEMA
Lifting	4 point cast in lugs
Bearing Type	Single Shield Ball
Bearing L10 Life	Direct Coupled - 50,000 hrs per IEEE 841
Bearing Caps	Cast Iron, gasketed
Bearing Lubricant	Polyurea
Bearing Re-Lubrication	Grease fitting & plug. Extended through the fan cover. Includes provisions for conversion to Oil Mist Lubrication
Bearing Protection	Non-contact rotating labyrinth seal on both ends
Fasteners	Hex Head, Zinc Plated
Condensation Drain	Stainless Steel T-drains at the lowest point of both end shields
Balance & Vibration	ISO 1940 Grade 1 Ball bearings - .040 peak in/sec
Vibration Pads	Cast in vibration pads for repeatable measurements
Nameplate	316 Stainless Steel
Paint	Epoxy ester, RAL 1001
Tests	NEMA Routine only

XSD Ultra 841 Vertical C-Face NT

TEFC—Extra Severe Duty (IP56)



Volts: 460
HP: 1 - 75

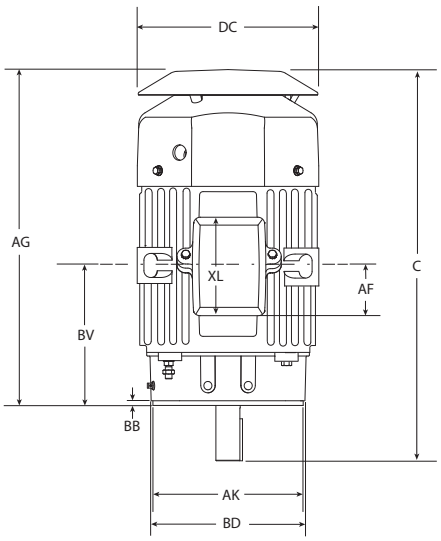
HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	L10 Down Thrust (lbs) @ 8,760 Hrs	L10 Down Thrust (lbs) @ 50,000 Hrs	Notes
1	3600	460	143TC	**M9400**	5KS143XAA145	N	260	120	
1	1800	460	143TC	**M9401**	5KS143XAA2008	N	332	146	
1.5	3600	460	143TC	**M9402**	5KS143XAA146	N	253	115	
1.5	1800	460	145TC	**M9403**	5KS145XAA2009	N	321	137	
1.5	1200	460	182TC	**M9404**	5KS182XAA326	N	690	308	
2	3600	460	145TC	**M9405**	5KS145XAA145	N	249	110	
2	1800	460	145TC	**M9406**	5KS145XAA2010	N	316	132	
2	1200	460	184TC	**M9407**	5KS184XAA325	N	677	295	
3	3600	460	182TC	**M9408**	5KS182XAA138	N	448	205	
3	1800	460	182TC	**M9409**	5KS182XAA2004	N	575	254	
3	1200	460	213TC	**M9410**	5KS213XAA335	N	1089	495	
5	3600	460	184TC	**M9411**	5KS184XAA1022	N	438	196	
5	1800	460	184TC	**M9412**	5KS184XAA2031	N	555	235	
5	1200	460	215TC	**M9500**	5KS215XAA341	N	1056	467	
7.5	3600	460	213TC	**M9501**	5KS213XAA1023	N	698	320	
7.5	1800	460	213TC	**M9502**	5KS213XAA2049	N	903	400	
7.5	1200	460	254TC	**M9503**	5KS254XAA335	N	1293	591	
10	3600	460	215TC	**M9504**	5KS215XAA1018	N	691	313	
10	1800	460	215TC	**M9505**	5KS215XAA2043	N	887	385	
10	1200	460	256TC	**M9506**	5KS256XAA327	N	1284	583	
15	3600	460	254TC	**M9507**	5KS254XAA1044	N	793	353	
15	1800	460	254TC	**M9508**	5KS254XAA2059	N	999	419	
15	1200	460	284TC	**M9509**	5KS284XAA338	N	1231	533	
20	3600	460	256TC	**M9513**	5KS256XAA198	N	761	321	
20	1800	460	256TC	**M9515**	5KS256XAA2041	N	999	412	
20	1200	460	286TC	**M9516**	5KS286XAA332	N	1189	490	
25	3600	460	284TC	**M9517**	5KS284XAA186	N	749	312	
25	3600	460	284TSC	**M9518**	5KS284XAA187	N	749	312	
25	1800	460	284TC	**M9519**	5KS284XAA2002	N	970	387	
25	1200	460	324TC	**M9520**	5KS324XAA354	N	1540	634	
30	3600	460	286TC	**M9521**	5KS286XAA167	N	712	275	
30	3600	460	286TSC	**M9522**	5KS286XAA168	N	712	275	
30	1800	460	286TC	**M9523**	5KS286XAA2010	N	944	362	
30	1200	460	326TC	**M9524**	5KS326XAA342	N	1540	634	
40	3600	460	324TSC	**M9525**	5KS324XAA1079	N	334	96	
40	1800	460	324TC	**M9526**	5KS324XAA2109	N	1295	539	
50	3600	460	326TSC	**M9527**	5KS326XAA1009	N	321	83	
50	1800	460	326TC	**M9528**	5KS326XAA2055	N	1247	492	
60	3600	460	364TSC	**M9529**	5KS364XAA187	N	543	172	
60	1800	460	364TC	**M9530**	5KS364XAA2034	N	1675	690	
75	3600	460	365TSC	**M9531**	5KS365XAA1002	N	523	154	
75	1800	460	365TC	**M9532**	5KS365XAA2034	N	1604	620	

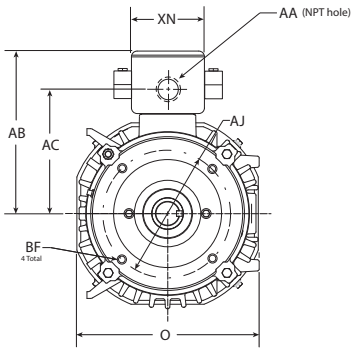
XSD Ultra 841 Vertical C-Face NT

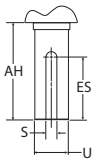
TEFC—Extra Severe Duty (IP56)



Dimensions







Frame	Approx. Net Weight in lbs	Dimensions in inches																	
		Shaft							Mounting										
		Key																	
		Width	Depth	Length	AH	ES	S	U	AF	AG	AK	AJ	BB (Min)	BF	BD	BV	C	DC	O
143TC	43	0.187	0.187	1.38	1.90	1.41	0.187	0.875	2.50	13.34	8.5	7.25	0.16	3/8-16 UNC	6.5	11.93	15.77	8	7.25
145TC	50	0.187	0.187	1.38	1.90	1.41	0.187	0.875	2.50	13.34	8.5	7.25	0.16	3/8-16 UNC	6.5	11.93	15.77	8	7.25
182TC	76	0.25	0.25	1.75	2.40	1.78	0.25	1.125	3.50	15.31	8.5	7.25	0.25	1/2-13 UNC	8.5	15.58	17.93	8.76	9.21
184TC	101	0.25	0.25	1.75	2.40	1.78	0.25	1.125	3.50	15.31	8.5	7.25	0.25	1/2-13 UNC	8.5	15.58	17.93	8.76	9.21
213TC	200	0.312	0.312	2.38	3.31	2.41	0.312	1.375	3.50	19	8.5	7.25	0.25	1/2-13 UNC	8.7	19.27	22.13	10.24	10.31
215TC	220	0.312	0.312	2.38	3.31	2.41	0.312	1.375	3.50	19	8.5	7.25	0.25	1/2-13 UNC	8.7	19.27	22.13	10.24	10.31
254TC	315	0.375	0.375	2.88	3.61	2.91	0.375	1.625	4.59	23.82	8.5	7.25	0.25	1/2-13 UNC	8.7	24.09	27.57	12.24	12.38
256TC	350	0.375	0.375	2.88	3.61	2.91	0.375	1.625	4.59	23.82	8.5	7.25	0.25	1/2-13 UNC	8.7	24.09	27.57	12.24	12.38
284TC	460	0.5	0.5	3.25	4.10	3.28	0.5	1.875	4.59	25.66	10.5	9	0.25	1/2-13 UNC	10.77	25.66	30.04	13.5	13.76
286TC	510	0.5	0.5	3.25	4.10	3.28	0.5	1.875	4.59	25.66	10.5	9	0.25	1/2-13 UNC	10.77	25.66	30.04	13.5	13.76
284TSC	460	0.375	0.375	1.88	3.00	1.91	0.375	1.625	4.59	25.66	10.5	9	0.25	1/2-13 UNC	10.77	25.93	28.66	13.5	13.76
286TSC	510	0.375	0.375	1.88	3.00	1.91	0.375	1.625	4.59	25.66	10.5	9	0.25	1/2-13 UNC	10.77	25.93	28.66	13.5	13.76
324TC	664	0.5	0.5	3.88	5.00	3.91	0.5	2.125	6.44	28	10.5	11	0.25	5/8-11 UNC	12.86	28.25	33	14.7	17
326TC	800	0.5	0.5	3.88	5.00	3.91	0.5	2.125	6.44	28	10.5	11	0.25	5/8-11 UNC	12.86	28.25	33	14.7	17
324TSC	664	0.5	0.5	2	3.50	2.03	0.5	1.875	6.44	28	12.5	11	0.25	5/8-11 UNC	12.86	28.25	31.5	14.7	16.68
326TSC	800	0.5	0.5	2	3.50	2.03	0.5	1.875	6.44	28	12.5	11	0.25	5/8-11 UNC	12.86	28.25	31.5	14.7	16.68
364TC	1122	0.625	0.5	4.25	5.62	4.28	0.625	2.375	6.44	32.45	12.5	11	0.25	5/8-11 UNC	13.02	32.7	38.06	19.02	18.86
365TC	1155	0.625	0.5	4.25	5.62	4.28	0.625	2.375	6.44	32.45	12.5	11	0.25	5/8-11 UNC	13.02	32.7	38.06	19.02	18.86
364TSC	1122	0.5	0.5	2	3.47	2.03	0.5	1.875	6.44	32.45	12.5	11	0.25	5/8-11 UNC	13.02	32.7	35.93	19.02	18.86
365TSC	1155	0.5	0.5	2	3.47	2.03	0.5	1.875	6.44	32.45	12.5	11	0.25	5/8-11 UNC	13.02	32.7	35.93	19.02	18.86

Frame	Nominal HP	Approx. Volume	AA (NPT Thread)	AB	AC	AF	XL	XN
143-145	2	32	3/4"	6.63	5.12	2.5	4.3	5.4
182-184	5	55	1"	8.7	6.62	3.5	5.78	4.16
213-215	10	55	1"	9.5	7.42	3.5	5.78	4.16
254-256	20	140	1-1/4"	12.15	9.12	4.59	7.37	5.37
284-286	30	140	1-1/2"	12.91	9.88	4.59	7.37	5.37
324-326	50	346	3"	16.13	12.43	6.44	10.15	7
364-365	75	346	3"	17.14	13.43	6.44	10.09	7

Notes

MV
High Power Motors

MV.3 449 Frame Ultra TEFC
MV.3 Standard Features
MV.4 Pricing
MV.5 Dimensions

MV.6 Quantum LMV – TEFC Low Voltage
MV.6 Standard Features
MV.7 Pricing
MV.19 Dimensions

MV.10 Quantum LMV – TEFC Low Voltage with IEEE 841 Features
MV.10 Standard Features
MV.11 Pricing
MV.19 Dimensions

MV.13 Quantum LMV – TEFC Medium Voltage
MV.13 Standard Features
MV.14 Pricing
MV.19 Dimensions

MV.16 Quantum LMV – TEFC Medium Voltage with IEEE 841 Features
MV.16 Standard Features
MV.17 Pricing
MV.19 Dimensions

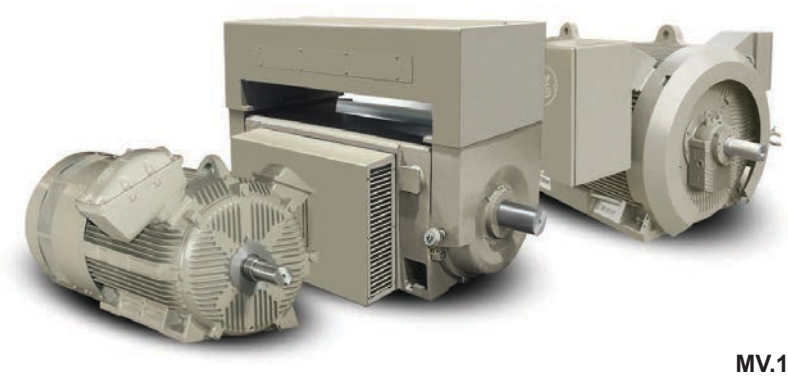
MV.21 500 Frames (ODP, WPI, WPII)
MV.21 Standard Features
MV.22 Pricing
MV.25 Dimensions

MV.27 Quantum 440, 500, and 580 – TEFC and WPII 2-Pole Surface Pump Systems
MV.27 Standard Features
MV.28 Pricing

MV.30 Quantum 580/7000 – TEFC Medium Voltage
MV.30 Standard Features
MV.31 Pricing
MV.33 Dimensions

MV.35 Quantum 580 – WPII Medium Voltage
MV.35 Standard Features
MV.36 Pricing
MV.38 Dimensions

MV.40 Keyless Shaft Motors for use on Reciprocating Compressors
MV.40 Standard Features
MV.41 Pricing
MV.46 Dimensions



WOLONG

Power your future



Quantum Medium Voltage Motors

Specially engineered to excel in Oil & Gas, Power Generation, Mining and other extreme industrial environments and applications.

100 - 7000 HP
900 - 3600 RPM
60 / 50 Hz
460, 575, 2300, 4000, 6600 V
TEFC, ODP, WPI, WPII, TEAAC

Solidly built motors, engineered to last.

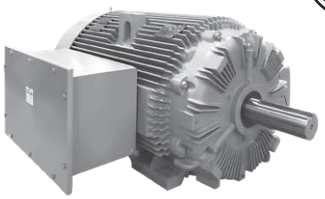
We've engineered motor frames, bearings, and windings to address all of the top factors that can shorten motor life. That is why Quantum motors are well known for their reliability in the field.

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449 Frame Ultra TEFC

Severe Duty Medium Voltage

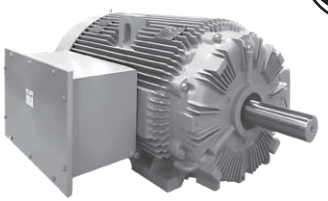
Standard Features



HP Range	125 - 350
Poles	2, 4, 6
Voltage	2300/4000
Altitude	3300 ft
Ambient	40°C
Balance/Vibration	.08 IPS
Bearing Caps	Both Ends
Bearing Protection	IP55; Shaft slinger both ends
Bearing Type	Single Shield Ball
Conduit Box	Fabricated Steel; Gasketed and rotatable in 90 degree increments
Drains	Stainless Steel T-drains in lowest section of both endshields
Efficiency	Premium
Enclosure	TEFC
End Shield	Cast Iron
Fan	Bi-directional Non-Sparking Plastic, Unidirectional Aluminum on 150HP - 250HP 2 poles CCW viewed from ODE
Fan Cover	Cast Iron
Fasteners	SAE Grade 5
Frame Material	Cast Iron
Frame Size	449
Frequency	60 Hz
Ground	Ground in conduit box and NEMA Type ground pad on frame
Hazardous Locations	Self Declared Class I Division 2 Groups A, B, C, D
Insulation Class	Class F
Insulation System	Epoxy VPI
Inverter Capabilities	Consult Factory
L10 Bearing Life	Direct Coupled: 130,000 hrs 4 and 6 pole; 65,000 hrs 2 pole
Leads	Permanently numbered, Non-wicking
Lifting Means	Two (2) cast in lifting lugs
Lubrication	Polyurea Grease
Mounting	Foot mounted F1 only
Mounting Holes	Dual drilled for 447/449 mounting
Nameplate	316 Stainless Steel
NEMA Design	B (250HP 2 pole NEMA A)
Paint	Epoxyester Buff
Relubrication	Grease fitting and plug; extended through the fan cover
Rotor	Cast Aluminum
Service Factor	1.15 (unless otherwise noted on pricing pages)
Shaft Material	AISI 1045
Space Heater	115V thermostatically controlled space heater, leads to accessory box
Stator Temp Device	100 Ohm Platinum stator winding RTD's, leads to accessory box
Temperature Rise	80°C @ 1.0 SF (unless otherwise noted on pricing pages)
Tests	NEMA Routine only
Time Rating	Continuous
Vibration Pads	Cast in vibration pads for repeatable measurements
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first

449 Frame Ultra TEFC

Severe Duty Medium Voltage



Volts: 2300/4000
HP: 125 - 350

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
125	3600	2300/4000	449TS	**M9800**	5KS449SAA1053	N	115, 125
125	1800	2300/4000	449T	**M9801**	5KS449SAA2142	N	97, 125
125	1200	2300/4000	449T	**M9802**	5KS449SAA3016	N	115, 125
150	3600	2300/4000	449TS	**M9803**	5KS449SAA1051	Y	62, 115, 125
150	1800	2300/4000	449T	**M9804**	5KS449SAA2143	Y	115, 125
150	1200	2300/4000	449T	**M9805**	5KS449SAA3017	N	115, 125
200	3600	2300/4000	449TS	**M9806**	5KS449SAA1049	N	62, 115, 125
200	1800	2300/4000	449T	**M9807**	5KS449SAA2139	Y	97, 125
200	1200	2300/4000	449T	**M9808**	5KS449SAA3018	N	97, 125, 149
250	3600	2300/4000	449TS	**M9809**	5KS449SAA1054	N	62, 97, 125
250	1800	2300/4000	449T	**M9810**	5KS449SAA2141	Y	35, 125
250	1200	2300/4000	449T	**M9850**	5KS449SAH339	N	35, 149, 175, 185
250	1200	2300/4000	449T	**M9852**	5KS449SAH340	N	35, 98, 149, 175, 185
300	3600	2300/4000	449TS	**M9818**	5KS449SAH129	N	66, 115, 125, 175, 178
300	3600	2300/4000	449TS	**M9819**	5KS449SAH132	N	62, 115, 125, 175, 178
300	1800	2300/4000	449T	**M9821**	5KS449SAH223	N	97, 125, 149, 175
350	1800	2300/4000	449T	**M9836**	5KS449SAH224	N	97, 125, 149, 175, 178

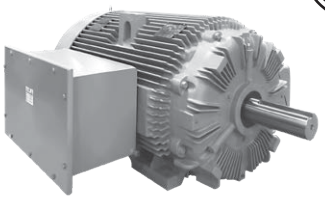
Notes:

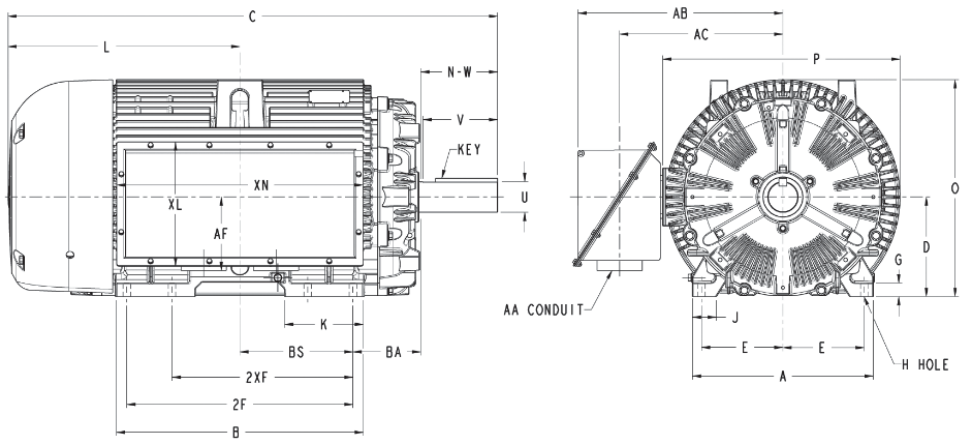
35 Does not meet 200C AIT (T3) - 230C AIT (T2C) and above only
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
97 Does not meet 200°C AIT at 1.0 SF - 215°C AIT and above only
98 For belted load only. Roller bearing on drive-end.
115 Meets 200°C AIT at 1.0 SF
125 Offset Core F1 only. Not convertible to F2
149 Class F rise @ 1.0 SF only
175 Special long “high output frame”. Refer to the 449HO rows in the dimensions table. This frame is not suitable for F1 to F2 conversion.
178 NEMA Design A Code H
185 MV models are Class F insulation

449 Frame Ultra TEFC

Severe Duty Medium Voltage

Dimensions





449 Frame, Totally Enclosed Fan Cooled

Frame	Shaft						Mounting						A	B	C	D[3]	G	J	K	L	O	P
	Keyway		Key																			
	Width	Depth	Length	N-W	U[1]	V[2]	E	H	BA	BS	2F	2XF										
449TS	0.625	0.625	3.000	4.75	2.375	4.50	9.00	0.81	7.50	12.50	25.00	20.00	20.00	27.30	50.37	11.00	1.49	2.64	8.70	25.62	23.94	26.25
449T	0.875	0.875	6.875	8.50	3.375	8.25	9.00	0.81	7.50	12.50	25.00	20.00	20.00	27.30	54.12	11.00	1.49	2.64	8.70	25.62	23.94	26.25
449TS (HO)	0.625	0.625	3.000	4.75	2.375	4.50									55.63							
449T (HO)	0.875	0.875	6.875	8.50	3.375	8.25	9.00	0.81	7.50	–	25.00	–	20.24	27.31	59.30	11.00	1.49	2.70	5.26	–	24.04	–
449LL (HO)			4.500	6.75		6.50									58.52							

Conduit Box Dimensions

Frame	Max. FL Amps[5]	Approx. Volume	AA	AB	AC[4]	AF	XL	XN
447-449	250	2500	2-4.00	22.68	18.05	8.12	13.73	27.24

Notes:

1 Tolerance on “U” dimension will be +0.000 inch -0.001 inch
2 Dimension “V” represents length of straight part of shaft extension
3 Tolerance on “D” dimension will be +0.000 inch -0.060 inch
4 Dimension to AA hole
5 Conduit box size is determined by full load amps

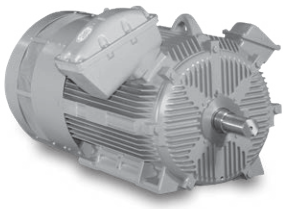
Providing mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward or from either side

Quantum™ LMV—TEFC

Severe Duty Low Voltage

Standard Features

NEMA Premium

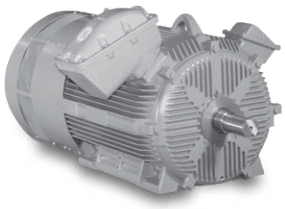


HP Range	150 - 700
Poles	2, 4, 6
Voltage	460, 575
Altitude	3300 ft
Ambient	40°C
Balance/Vibration	NEMA Grade B
Bearing Caps	Both Ends
Bearing Protection	IP55; Shaft slinger both ends
Bearing Temp Device	Provisions on DE and ODE Endshield; plugged
Bearing Type	Single Shielded Ball; 509L & 5011L have DE roller bearing
Conduit Box	Cast Iron or Fabricated Steel; Gasketed and rotatable in 90 degree increments
Div 2 Temp Codes	CSA Certified Class I Div 2 Groups A, B, C, D T3 200C AIT at 1.0 SF (unless otherwise noted on pricing pages)
Drains	Stainless Steel T-drains in lowest section of both endshields
Efficiency	NEMA Premium (Meets or exceeds EISA efficiency requirements 350-500HP)
Enclosure	TEFC
End Shield	Cast Iron
Fan	Aluminum (Unidirectional on 2 poles)
Fan Cover	Fabricated Steel
Fasteners	SAE Grade 5
Frame Material	Cast Iron
Frame Size	509-5013
Frequency	60 Hz
Ground	Ground in conduit box and 2 NEMA Type ground pads on frame
Insulation Class	Class F
Insulation System	Epoxy VPI
Inverter Capabilities	GE recommends bearing current mitigation for VFD use. Consult factory.
Bearing L10 Life	Belted - 26,280 hrs; Direct Coupled - 100,000 hrs
Leads	Permanently numbered, Non-wicking
Lifting Means	Two (2) cast in lifting lugs
Lubrication	Polyurea Grease
Mounting	Foot mounted F1 only, contact factory for F2 mounting options
Mounting Holes	Dual drilled for 508/509, 5010/5011, 5012/5013 mounting
Nameplate	316 Stainless Steel
NEMA Design	Standard Torque
Paint	Epoxyester Buff
Relubrication	Yes, both ends; extended through the fan cover
Rotor	Cast Aluminum
Service Factor	1.15 (unless otherwise noted on pricing pages)
Shaft Material	AISI 1045; 509L and 5011L AISI 4142
Space Heater	115V thermostatically controlled, leads to accessory box
Temperature Rise	80°C @ 1.0 SF (unless otherwise noted on pricing pages)
Tests	NEMA Routine, IEEE 112 Method B
Time Rating	Continuous
Vibration Pads	Cast in vibration pads for repeatable measurements
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first

Quantum™ LMV—TEFC

Severe Duty Low Voltage

NEMA Premium



Volts: 460, 575
Frequency: 60 Hz
HP: 150 - 700

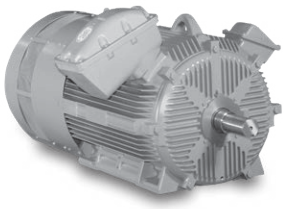
HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
150	600	460	5011LL	**Q5048**	5KS511SAA625	N	
200	3600	460	507SS	**Q5050**	5KS507SAA122	N	66, 178
200	3600	460	507SS	**Q5051**	5KS507SAA123	N	62, 178
200	900	460	509LL	**Q5064**	5KS509SAA429	N	
250	3600	460	507SS	**Q5059**	5KS507SAA125	N	66
250	3600	460	507SS	**Q5060**	5KS507SAA126	N	62
250	1800	460	507SLL	**Q5054**	5KS507SAA226	N	
250	1800	460	507SL	**Q5056**	5KS507SAA228	N	148
250	1200	460	509L	**Q5049**	5KS509SAA391	N	148
300	3600	460	507SS	**Q5061**	5KS507SAA127	N	66
300	3600	460	507SS	**Q5062**	5KS507SAA128	N	62
300	3600	460	509LS	**Q532**	5KS509SAA124	N	66
300	3600	460	509LS	**Q533**	5KS509SAA125	N	62
300	3600	575	509LS	**Q539**	5KS509SAA126	N	66
300	3600	575	509LS	**Q545**	5KS509SAA127	N	62
300	1800	460	507SLL	**Q5057**	5KS507SAA229	N	
300	1800	460	507SL	**Q5055**	5KS507SAA227	N	148
300	1800	460	509LL	**Q575**	5KS509SAA257	N	
300	1800	460	509L	**Q576**	5KS509SAA258	N	148
300	1800	575	509LL	**Q577**	5KS509SAA259	N	
300	1800	575	509L	**Q578**	5KS509SAA260	N	148
300	1200	460	509LL	**Q579**	5KS509SAA346	Y	
300	1200	460	509L	**Q580**	5KS509SAA347	N	148
300	1200	575	509LL	**Q581**	5KS509SAA348	N	
300	1200	575	509L	**Q582**	5KS509SAA349	N	148
350	3600	460	5011LS	**Q540**	5KS511SAA176	N	66
350	3600	460	5011LS	**Q527**	5KS511SAA143	N	62
350	3600	575	5011LS	**Q546**	5KS511SAA185	N	66
350	3600	575	5011LS	**Q547**	5KS511SAA186	N	62
350	1800	460	507SLL	**Q5052**	5KS507SAA224	N	
350	1800	460	507SL	**Q5053**	5KS507SAA225	N	148
350	1800	460	509LL	**Q583**	5KS509SAA261	N	
350	1800	460	509L	**Q584**	5KS509SAA262	N	148
350	1800	575	509LL	**Q585**	5KS509SAA263	N	
350	1800	575	509L	**Q586**	5KS509SAA264	N	148
350	1200	460	5011LL	**Q587**	5KS511SAA367	N	
350	1200	460	5011L	**Q588**	5KS511SAA368	N	148
350	1200	575	5011LL	**Q589**	5KS511SAA369	N	
350	1200	575	5011L	**Q590**	5KS511SAA370	N	148

Notes:
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
148 Roller bearing on drive-end. High strength shaft material. For belted loads only. Refer to model details for max radial load.
178 NEMA Design A Code H

Quantum™ LMV—TEFC

Severe Duty Low Voltage

NEMA Premium



Volts: 460, 575
Frequency: 60 Hz
HP: 150 - 700

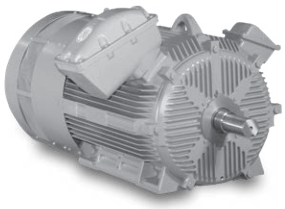
HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
400	3600	460	5011LS	**Q541**	5KS511SAA177	N	66
400	3600	460	5011LS	**Q528**	5KS511SAA144	N	62
400	3600	575	5011LS	**Q548**	5KS511SAA187	N	66
400	3600	575	5011LS	**Q549**	5KS511SAA188	N	62
400	1800	460	507SL	**Q5058**	5KS507SAA230	N	
400	1800	460	507SL	**Q5063**	5KS507SAA231	N	148
400	1800	460	509LL	**Q591**	5KS509SAA265	N	
400	1800	460	509L	**Q592**	5KS509SAA266	N	148
400	1800	575	509LL	**Q593**	5KS509SAA267	N	
400	1800	575	509L	**Q594**	5KS509SAA268	N	148
400	1200	460	5011LL	**Q595**	5KS511SAA371	Y	
400	1200	460	5011L	**Q596**	5KS511SAA372	Y	148
400	1200	575	5011LL	**Q597**	5KS511SAA373	N	
400	1200	575	5011L	**Q598**	5KS511SAA374	N	148
450	3600	460	5011LS	**Q542**	5KS511SAA178	N	66
450	3600	460	5011LS	**Q529**	5KS511SAA145	N	62
450	3600	575	5011LS	**Q557**	5KS511SAA189	N	66
450	3600	575	5011LS	**Q558**	5KS511SAA190	N	62
450	1800	460	5011LL	**Q599**	5KS511SAA299	N	
450	1800	460	5011L	**Q5000**	5KS511SAA2001	N	148
450	1800	575	5011LL	**Q5001**	5KS511SAA2002	N	
450	1800	575	5011L	**Q5002**	5KS511SAA2003	N	148
450	1200	460	5011LL	**Q5003**	5KS511SAA375	N	
450	1200	460	5011L	**Q5004**	5KS511SAA376	N	148
450	1200	575	5011LL	**Q5005**	5KS511SAA377	N	
450	1200	575	5011L	**Q5006**	5KS511SAA378	N	148
500	3600	460	5011LS	**Q543**	5KS511SAA179	N	66
500	3600	460	5011LS	**Q530**	5KS511SAA146	N	62
500	3600	575	5011LS	**Q559**	5KS511SAA191	N	66
500	3600	575	5011LS	**Q560**	5KS511SAA192	N	62
500	1800	460	5011LL	**Q5007**	5KS511SAA2004	Y	
500	1800	460	5011L	**Q5008**	5KS511SAA2005	N	148
500	1800	575	5011LL	**Q5009**	5KS511SAA2006	N	
500	1800	575	5011L	**Q5010**	5KS511SAA2007	N	148
500	1200	460	5013S	**Q5011**	5KS513SAA357	N	
500	1200	575	5013S	**Q5013**	5KS513SAA359	N	

Notes:
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
148 Roller bearing on drive-end. High strength shaft material. For belted loads only. Refer to model details for max radial load.

Quantum™ LMV—TEFC

Severe Duty Low Voltage

NEMA Premium



Volts: 460, 575
Frequency: 60 Hz
HP: 150 - 700

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
600	3600	460	5013ST	**Q544**	5KS513SAA145	N	66
600	3600	460	5013ST	**Q531**	5KS513SAA128	N	62
600	3600	575	5013ST	**Q561**	5KS513SAA171	N	66
600	3600	575	5013ST	**Q562**	5KS513SAA172	N	62
600	1800	460	5013S	**Q5015**	5KS513SAA256	Y	
600	1800	575	5013S	**Q5017**	5KS513SAA258	N	
600	1200	460	5013S	**Q5019**	5KS513SAA361	N	147, 149
600	1200	575	5013S	**Q5021**	5KS513SAA363	N	147, 149
700	3600	460	5013ST	**Q563**	5KS513SAA173	N	66, 149
700	3600	460	5013ST	**Q564**	5KS513SAA174	N	62, 149
700	3600	575	5013ST	**Q565**	5KS513SAA175	N	66, 149
700	3600	575	5013ST	**Q566**	5KS513SAA176	N	62, 149
700	1800	460	5013S	**Q5023**	5KS513SAA260	N	147, 149
700	1800	575	5013S	**Q5025**	5KS513SAA262	N	147, 149
700	1200	460	5013S	**Q5027**	5KS513SAA365	N	146, 149
700	1200	575	5013S	**Q5029**	5KS513SAA367	N	146, 149

Notes:
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
146 Does not meet 200C AIT (T3) - 260C AIT (T2B) and above only
147 Does not meet 200C AIT - 215C AIT and above only
149 Class F rise @ 1.0 SF only

Quantum™ LMV—TEFC

Severe Duty Low Voltage with IEEE 841 Features

NEMA Premium



Standard Features

HP Range	125 - 500
Poles	2, 4, 6
Voltage	460, 575
Altitude	3300 ft
Ambient	40°C to -25°C
Balance/Vibration	NEMA Grade B
Bearing Caps	Both Ends
Bearing Protection	IP55; Non-contact rotating labyrinth seal on both ends
Bearing Temp Device	100 Ohm Platinum RTD both bearings
Bearing Type	Single Shielded Ball; 509L & 5011L have DE roller bearing
Conduit Box	Cast Iron or Fabricated Steel; Gasketed and rotatable in 90 degree increments
Div 2 Temp Codes	CSA Certified Class I Div 2 Groups A, B, C, D T3 200C AIT at 1.0 SF
Drains	Stainless Steel T-drains in lowest section of both endshields
Efficiency	Meets or exceeds IEEE 841-2009 efficiency requirements
Enclosure	TEFC
End Shield	Cast Iron
Fan	Bronze (Unidirectional on 2 poles)
Fan Cover	Fabricated Steel
Fasteners	SAE Grade 5
Foot Draft Angle	+/- 1.5 degrees
Frame Material	Cast Iron
Frame Size	509-5013
Frequency	60 Hz
Ground	Ground in conduit box and 2 NEMA Type ground pads on frame
Insulation Class	Class F
Insulation System	Epoxy VPI
Inverter Capabilities	GE recommends bearing current mitigation for VFD use. Consult factory.
Bearing L10 Life	Belted - 26,280 hrs; Direct Coupled - 100,000 hrs
Leads	Permanently numbered, Non-wicking
Lifting Means	Two (2) cast in lifting lugs
Lubrication	Polyurea Grease
Mounting	Foot mounted F1 only, contact factory for F2 mounting options
Mounting Holes	Dual drilled for 508/509, 5010/5011, 5012/5013 mounting
Nameplate	316 Stainless Steel
NEMA Design	Standard Torque
Oil Mist Lube	Includes provisions for conversion to Oil Mist Lubrication
Paint	Epoxyester Buff, meets IEEE 841
Relubrication	Yes, both ends; extended through the fan cover
Rotor	Cast Aluminum
Service Factor	1.15 (unless otherwise noted on pricing pages)
Shaft Material	AISI 1045; 509L and 5011L AISI 4142
Space Heater	115V thermostatically controlled, leads to accessory box
Stator Temp Device	100 Ohm Platinum stator winding RTD's, leads to accessory box
Temperature Rise	80°C @ 1.0 SF
Tests	NEMA Routine Report including vibration supplied with motor, IEEE 112 Method B
Time Rating	Continuous
Vibration Pads	Cast in vibration pads for repeatable measurements
Warranty	60 months from date of installation or 66 months from date of manufacture, whichever occurs first

Quantum™ LMV—TEFC

Severe Duty Low Voltage with IEEE 841 Features

NEMA Premium



Volts: 460, 575
HP: 125 - 500

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
125	600	460	509LL	**Q804**	5KS509XAA608	N	
250	900	460	5011LL	**Q805**	5KS511XAA427	N	
300	3600	460	509LS	**Q8120**	5KS509XAA130	N	66, 112
300	3600	460	509LS	**Q814**	5KS509XAA123	N	62, 112
300	3600	575	509LS	**Q815**	5KS509XAA124	N	66, 112
300	3600	575	509LS	**Q816**	5KS509XAA125	N	62, 112
300	1800	460	509LL	**Q846**	5KS509XAA246	N	112
300	1800	460	509L	**Q847**	5KS509XAA247	N	112, 148
300	1800	575	509LL	**Q848**	5KS509XAA248	N	112
300	1800	575	509L	**Q849**	5KS509XAA249	N	112, 148
300	1200	460	509LL	**Q8108**	5KS509XAA361	N	112
300	1200	460	509L	**Q850**	5KS509XAA362	N	112, 148
300	1200	575	509LL	**Q851**	5KS509XAA363	N	112
300	1200	575	509L	**Q855**	5KS509XAA364	N	112, 148
350	3600	460	5011LS	**Q8121**	5KS511XAA155	N	66, 112
350	3600	460	5011LS	**Q8100**	5KS511XAA156	N	62, 112
350	3600	575	5011LS	**Q817**	5KS511XAA140	N	66, 112
350	3600	575	5011LS	**Q818**	5KS511XAA141	N	62, 112
350	1800	460	509LL	**Q8104**	5KS509XAA261	N	112
350	1800	460	509L	**Q856**	5KS509XAA250	N	112, 148
350	1800	575	509LL	**Q861**	5KS509XAA232	N	112
350	1800	575	509L	**Q857**	5KS509XAA251	N	112, 148
350	1200	460	5011LL	**Q8109**	5KS511XAA364	N	112
350	1200	460	5011L	**Q858**	5KS511XAA350	N	112, 148
350	1200	575	5011LL	**Q852**	5KS511XAA340	N	112
350	1200	575	5011L	**Q859**	5KS511XAA351	N	112, 148
400	3600	460	5011LS	**Q8122**	5KS511XAA157	N	66, 112
400	3600	460	5011LS	**Q8101**	5KS511XAA158	N	62, 112
400	3600	575	5011LS	**Q819**	5KS511XAA142	N	66, 112
400	3600	575	5011LS	**Q825**	5KS511XAA143	N	62, 112
400	1800	460	509LL	**Q8105**	5KS509XAA262	N	112
400	1800	460	509L	**Q860**	5KS509XAA252	N	112, 148
400	1800	575	509LL	**Q862**	5KS509XAA236	N	112
400	1800	575	509L	**Q865**	5KS509XAA253	N	112, 148
400	1200	460	5011LL	**Q8110**	5KS511XAA365	N	112
400	1200	460	5011L	**Q866**	5KS511XAA352	N	112, 148
400	1200	575	5011LL	**Q853**	5KS511XAA341	N	112
400	1200	575	5011L	**Q867**	5KS511XAA353	N	112, 148

Notes:

62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
112 Noise level exceeds IEEE 841
148 Roller bearing on drive-end. High strength shaft material. For belted loads only. Refer to model details for max radial load.

Quantum™ LMV—TEFC

Severe Duty Low Voltage with IEEE 841 Features

NEMA Premium



Volts: 460, 575
HP: 125 - 500

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
450	3600	460	5011LS	**Q8123**	5KS511XAA159	N	66, 112
450	3600	460	5011LS	**Q8102**	5KS511XAA160	N	62, 112
450	3600	575	5011LS	**Q826**	5KS511XAA144	N	66, 112
450	3600	575	5011LS	**Q827**	5KS511XAA145	N	62, 112
450	1800	460	5011LL	**Q8106**	5KS511XAA253	N	112
450	1800	460	5011L	**Q868**	5KS511XAA243	N	112, 148
450	1800	575	5011LL	**Q863**	5KS511XAA238	N	112
450	1800	575	5011L	**Q869**	5KS511XAA244	N	112, 148
450	1200	460	5011LL	**Q8111**	5KS511XAA366	N	112
450	1200	460	5011L	**Q870**	5KS511XAA354	N	112, 148
450	1200	575	5011LL	**Q854**	5KS511XAA342	N	112
450	1200	575	5011L	**Q871**	5KS511XAA355	N	112, 148
500	3600	460	5011LS	**Q8124**	5KS511XAA161	N	66, 112
500	3600	460	5011LS	**Q8103**	5KS511XAA162	N	62, 112
500	3600	575	5011LS	**Q828**	5KS511XAA146	N	66, 112
500	3600	575	5011LS	**Q829**	5KS511XAA147	N	62, 112
500	1800	460	5011LL	**Q8107**	5KS511XAA254	N	112
500	1800	460	5011L	**Q872**	5KS511XAA245	N	112, 148
500	1800	575	5011LL	**Q864**	5KS511XAA234	N	112
500	1800	575	5011L	**Q873**	5KS511XAA246	N	112, 148
500	1200	460	5013S	**Q874**	5KS513XAA322	N	112
500	1200	575	5013S	**Q876**	5KS513XAA324	N	112

Notes:

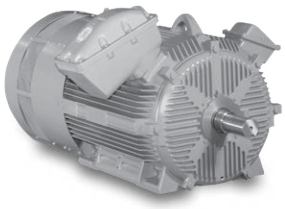
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
112 Noise level exceeds IEEE 841
148 Roller bearing on drive-end. High strength shaft material. For belted loads only. Refer to model details for max radial load.

Quantum™ LMV—TEFC

Severe Duty Medium Voltage

Standard Features

NEMA Premium

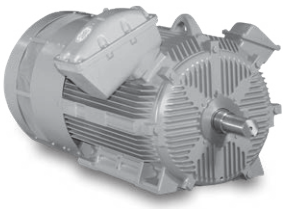


HP Range	125 - 800
Poles	2, 4, 6
Voltage	2300/4000
Altitude	3300 ft
Ambient	40°C
Balance/Vibration	NEMA Grade B
Bearing Caps	Both Ends
Bearing Protection	IP55; Shaft slinger both ends
Bearing Temp Device	100 Ohm Platinum RTD both bearings
Bearing Type	Single Shielded Ball; 509L & 5011L have DE roller bearing
Conduit Box	Fabricated Steel; Gasketed and rotatable in 90 degree increments
Div 2 Temp Codes	CSA Certified Class I Div 2 Groups A, B, C, D T3 200C AIT at 1.0 SF (unless otherwise noted on pricing pages)
Drain	Stainless Steel T-drains in lowest section of both endshields
Efficiency	NEMA Premium
Enclosure	TEFC
End Shield	Cast Iron
Fan	Aluminum (Unidirectional on 2 poles)
Fan Cover	Fabricated Steel
Fasteners	SAE Grade 5
Frame Material	Cast Iron
Frame Size	509-5013
Frequency	60 Hz
Ground	Ground in conduit box and 2 NEMA Type ground pads on frame
Insulation Class	Class F
Insulation System	Epoxy VPI
Inverter Capabilities	Consult Factory
Bearing L10 Life	Belted - 26,280 hrs; Direct Coupled - 100,000 hrs
Leads	Permanently numbered, Non-wicking
Lifting Means	Two (2) cast in lifting lugs
Lubrication	Polyurea Grease
Mounting	Foot mounted F1 only, contact factory for F2 mounting options
Mounting Holes	Dual drilled for 508/509, 5010/5011, 5012/5013 mounting
Nameplate	316 Stainless Steel
NEMA Design	Standard Torque
Paint	Epoxyester Buff
Relubrication	Yes, both ends; extended through the fan cover
Rotor	Cast Aluminum
Service Factor	1.15 (unless otherwise noted on pricing pages)
Shaft Material	AISI 1045; 509L and 5011L AISI 4142
Space Heater	115V thermostatically controlled, leads to accessory box
Stator Temp Device	100 Ohm Platinum stator winding RTD's, leads to accessory box
Temperature Rise	80°C @ 1.0 SF (unless otherwise noted on pricing pages)
Tests	NEMA Routine; IEEE 112 Method B
Time Rating	Continuous
Vibration Pads	Cast in vibration pads for repeatable measurements
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first

Quantum™ LMV—TEFC

Severe Duty Medium Voltage

NEMA Premium



Volts: 2300/4000
HP: 125 - 800

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
125	3600	2300/4000	449TS	**M9800**	5KS449SAA1053	N	115, 125
125	1800	2300/4000	449T	**M9801**	5KS449SAA2142	N	97, 125
125	1200	2300/4000	449T	**M9802**	5KS449SAA3016	N	115, 125
150	3600	2300/4000	449TS	**M9803**	5KS449SAA1051	Y	62, 115, 125
150	1800	2300/4000	449T	**M9804**	5KS449SAA2143	Y	115, 125
150	1200	2300/4000	449T	**M9805**	5KS449SAA3017	N	115, 125
200	3600	2300/4000	449TS	**M9806**	5KS449SAA1049	N	62, 115, 125
200	1800	2300/4000	449T	**M9807**	5KS449SAA2139	Y	97, 125
200	1200	2300/4000	449T	**M9808**	5KS449SAA3018	N	97, 125, 149
200	1200	2300/4000	509LL	**Q534**	5KS509SAA335	N	
200	1200	2300/4000	509L	**Q514**	5KS509SAA326	N	148
250	3600	2300/4000	449TS	**M9809**	5KS449SAA1054	N	62, 97, 125
250	3600	2300/4000	509LS	**Q550**	5KS509SAA122	Y	66
250	3600	2300/4000	509LS	**Q500**	5KS509SAA121	N	62
250	1800	2300/4000	449T	**M9810**	5KS449SAA2141	Y	35, 125
250	1800	2300/4000	509LL	**Q507**	5KS509SAA234	N	
250	1800	2300/4000	509L	**Q5031**	5KS509SAA269	Y	148
250	1200	2300/4000	509LL	**Q535**	5KS509SAA336	N	
250	1200	2300/4000	509L	**Q515**	5KS509SAA327	N	148
300	3600	2300/4000	5011LS	**Q551**	5KS511SAA1015	N	66
300	3600	2300/4000	5011LS	**Q501**	5KS511SAA1016	N	62
300	1800	2300/4000	509LL	**Q508**	5KS509SAA235	N	
300	1800	2300/4000	509L	**Q5032**	5KS509SAA270	Y	148
300	1200	2300/4000	5011LL	**Q536**	5KS511SAA358	Y	
300	1200	2300/4000	5011L	**Q516**	5KS511SAA338	Y	148
350	3600	2300/4000	5011LS	**Q552**	5KS511SAA167	Y	66
350	3600	2300/4000	5011LS	**Q502**	5KS511SAA140	N	62
350	1800	2300/4000	509LL	**Q5046**	5KS509SAA2082	N	
350	1800	2300/4000	509L	**Q5047**	5KS509SAA2083	N	148
350	1800	2300/4000	5011LL	**Q509**	5KS511SAA244	N	
350	1800	2300/4000	5011L	**Q5033**	5KS511SAA2008	Y	148
350	1200	2300/4000	5011LL	**Q537**	5KS511SAA359	N	
350	1200	2300/4000	5011L	**Q517**	5KS511SAA339	Y	148
400	3600	2300/4000	5011LS	**Q553**	5KS511SAA168	N	66
400	3600	2300/4000	5011LS	**Q503**	5KS511SAA141	N	62

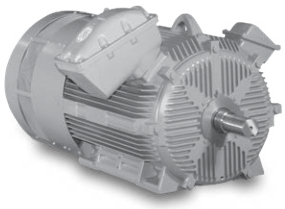
Notes:

35 Does not meet 200C AIT (T3) - 230C AIT (T2C) and above only
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
97 Does not meet 200°C AIT at 1.0 SF - 215°C AIT and above only
115 Meets 200°C AIT at 1.0 SF
125 Offset Core F1 only. Not convertible to F2
148 Roller bearing on drive-end. High strength shaft material. For belted loads only. Refer to model details for max radial load.
149 Class F rise @ 1.0 SF only

Quantum™ LMV—TEFC

Severe Duty Medium Voltage

NEMA® Premium



Volts: 2300/4000
HP: 125 - 800

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
400	1800	2300/4000	5011LL	**Q510**	5KS511SAA245	Y	
400	1800	2300/4000	5011L	**Q5034**	5KS511SAA2009	Y	148
400	1200	2300/4000	5011LL	**Q538**	5KS511SAA357	N	
400	1200	2300/4000	5011L	**Q518**	5KS511SAA340	N	148
450	3600	2300/4000	5011LS	**Q554**	5KS511SAA169	Y	66
450	3600	2300/4000	5011LS	**Q504**	5KS511SAA142	N	62
450	1800	2300/4000	5011LL	**Q511**	5KS511SAA276	Y	
450	1800	2300/4000	5011L	**Q5035**	5KS511SAA2010	Y	148
450	1200	2300/4000	5013S	**Q519**	5KS513SAA326	N	
500	3600	2300/4000	5013ST	**Q555**	5KS513SAA143	N	66
500	3600	2300/4000	5013ST	**Q505**	5KS513SAA126	N	62
500	1800	2300/4000	5011LL	**Q5044**	5KS511SAA2076	N	
500	1800	2300/4000	5011L	**Q5045**	5KS511SAA2077	N	148
500	1800	2300/4000	5013S	**Q512**	5KS513SAA226	Y	
500	1200	2300/4000	5013S	**Q520**	5KS513SAA327	Y	
600	3600	2300/4000	5013ST	**Q556**	5KS513SAA144	Y	66, 147, 149
600	3600	2300/4000	5013ST	**Q506**	5KS513SAA127	N	62, 147, 149
600	1800	2300/4000	5013S	**Q513**	5KS513SAA227	Y	
600	1200	2300/4000	5013S	**Q521**	5KS513SAA328	N	147, 149
700	3600	2300/4000	5013ST	**Q567**	5KS513SAA177	N	66, 147, 149
700	3600	2300/4000	5013ST	**Q568**	5KS513SAA178	N	62, 147, 149
700	1800	2300/4000	5013S	**Q5041**	5KS513SAA266	N	133, 149
800	3600	2300/4000	5013ST	**Q569**	5KS513SAA179	N	35, 66, 149
800	3600	2300/4000	5013ST	**Q570**	5KS513SAA180	N	35, 62, 149
800	1800	2300/4000	5013S	**Q5043**	5KS513SAA268	N	133, 147, 149

Notes:

35 Does not meet 200C AIT (T3) - 230C AIT (T2C) and above only
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
133 Fabricated Copper Bar Rotor
147 Does not meet 200C AIT - 215C AIT and above only
148 Roller bearing on drive-end. High strength shaft material. For belted loads only. Refer to model details for max radial load.
149 Class F rise @ 1.0 SF only

Quantum™ LMV—TEFC

Severe Duty Medium Voltage with IEEE 841 Features

NEMA Premium



Standard Features

HP Range	200 - 500
Poles	2, 4, 6
Voltage	2300/4000
Altitude	3300 ft
Ambient	40°C to -25°C
Balance/Vibration	NEMA Grade B
Bearing Caps	Both Ends
Bearing Protection	IP55; Non-contact rotating labyrinth seal on both ends
Bearing Temp Device	100 Ohm Platinum RTD both bearings
Bearing Type	Single Shielded Ball; 509L & 5011L have DE roller bearing
Conduit Box	Fabricated Steel; Gasketed and rotatable in 90 degree increments
Div 2 Temp Codes	CSA Certified Class I Div 2 Groups A, B, C, D T3 200C AIT at 1.0 SF (unless otherwise noted on pricing pages)
Drains	Stainless Steel T-drains in lowest section of both endshields
Efficiency	Meets or exceeds IEEE 841-2009 efficiency requirements
Enclosure	TEFC
End Shield	Cast Iron
Fan	Bronze (Unidirectional on 2 poles)
Fan Cover	Fabricated Steel
Fasteners	SAE Grade 5
Foot Draft Angle	+/- 1.5 degrees
Frame Material	Cast Iron
Frame Size	509-5013
Frequency	60 Hz
Ground	Ground in conduit box and 2 NEMA Type ground pads on frame
Insulation Class	Class F
Insulation System	Epoxy VPI
Inverter Capabilities	Consult Factory
Bearing L10 Life	Belted - 26,280 hrs; Direct Coupled - 100,000 hrs
Leads	Permanently numbered, Non-wicking
Lifting Means	Two (2) cast in lifting lugs
Lubrication	Polyurea Grease
Mounting	Foot mounted F1 only, contact factory for F2 mounting options
Mounting Holes	Dual drilled for 508/509, 5010/5011, 5012/5013 mounting
Nameplate	316 Stainless Steel
NEMA Design	Standard Torque
Oil Mist Lube	Includes provisions for conversion to Oil Mist Lubrication
Paint	Epoxyester Buff, meets IEEE 841
Relubrication	Yes, both ends; extended through the fan cover
Rotor	Cast Aluminum
Service Factor	1.15 (unless otherwise noted on pricing pages)
Shaft Material	AISI 1045; 509L and 5011L AISI 4142
Space Heater	115V thermostatically controlled, leads to accessory box
Stator Temp Device	100 Ohm Platinum stator winding RTD's, leads to accessory box
Temperature Rise	80°C @ 1.0 SF (unless otherwise noted on pricing pages)
Tests	NEMA Routine Report including vibration supplied with motor, IEEE 112 Method B
Time Rating	Continuous
Vibration Pads	Cast in vibration pads for repeatable measurements
Warranty	60 months from date of installation or 66 months from date of manufacture, whichever occurs first

Quantum™ LMV—TEFC

Severe Duty Medium Voltage with IEEE 841 Features

NEMA Premium



Volts: 2300/4000
HP: 200 - 500

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
200	1200	2300/4000	509LL	**Q878**	5KS509XAA350	N	
200	1200	2300/4000	509L	**Q879**	5KS509XAA351	N	148
250	3600	2300/4000	507SS	**Q8008**	5KS507XAA120	N	66, 112
250	3600	2300/4000	507SS	**Q8009**	5KS507XAA123	N	62, 112
250	3600	2300/4000	509LS	**Q830**	5KS509XAA126	N	66, 112
250	3600	2300/4000	509LS	**Q831**	5KS509XAA127	N	62
250	1800	2300/4000	507SLL	**Q8020**	5KS507XAA226	N	112
250	1800	2300/4000	507SL	**Q8011**	5KS507XAA225	N	112, 148
250	1800	2300/4000	509LL	**Q880**	5KS509XAA254	N	112
250	1800	2300/4000	509L	**Q881**	5KS509XAA255	N	112, 148
250	1200	2300/4000	509LL	**Q882**	5KS509XAA352	Y	112
250	1200	2300/4000	509L	**Q883**	5KS509XAA353	Y	112, 148
300	3600	2300/4000	507SS	**Q8014**	5KS507XAA121	N	66, 112, 178
300	3600	2300/4000	507SS	**Q8015**	5KS507XAA122	N	62, 112, 178
300	3600	2300/4000	5011LS	**Q832**	5KS511XAA175	N	66, 112
300	3600	2300/4000	5011LS	**Q833**	5KS511XAA176	N	62, 112
300	1800	2300/4000	507SLL	**Q8010**	5KS507XAA224	N	112
300	1800	2300/4000	507SL	**Q8013**	5KS507XAA227	N	112, 148
300	1800	2300/4000	509LL	**Q884**	5KS509XAA256	Y	112
300	1800	2300/4000	509L	**Q885**	5KS509XAA257	N	112, 148
300	1200	2300/4000	5011LL	**Q886**	5KS511XAA356	Y	112
300	1200	2300/4000	5011L	**Q887**	5KS511XAA357	Y	148
350	3600	2300/4000	5011LS	**Q834**	5KS511XAA148	N	66, 112
350	3600	2300/4000	5011LS	**Q835**	5KS511XAA149	N	62, 112
350	1800	2300/4000	507SLL	**Q8016**	5KS507XAA220	N	112
350	1800	2300/4000	507SL	**Q8017**	5KS507XAA221	N	112, 148
350	1800	2300/4000	509LL	**Q8006**	5KS509XAA2028	Y	112
350	1800	2300/4000	509L	**Q8007**	5KS509XAA2029	Y	112, 148
350	1800	2300/4000	5011LL	**Q888**	5KS511XAA247	Y	112
350	1800	2300/4000	5011L	**Q889**	5KS511XAA248	N	112, 148
350	1200	2300/4000	5011LL	**Q890**	5KS511XAA358	Y	112
350	1200	2300/4000	5011L	**Q891**	5KS511XAA359	Y	148
400	3600	2300/4000	5011LS	**Q836**	5KS511XAA150	N	66, 112
400	3600	2300/4000	5011LS	**Q837**	5KS511XAA151	N	62, 112
400	1800	2300/4000	507SL	**Q8018**	5KS507XAA222	N	112, 178
400	1800	2300/4000	507SL	**Q8019**	5KS507XAA223	N	112, 148, 178
400	1800	2300/4000	5011LL	**Q892**	5KS511XAA249	Y	112
400	1800	2300/4000	5011L	**Q893**	5KS511XAA250	N	112, 148

Notes:

62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
112 Noise level exceeds IEEE 841
148 Roller bearing on drive-end. High strength shaft material. For belted loads only. Refer to model details for max radial load.
178 NEMA Design A Code H

Quantum™ LMV—TEFC

Severe Duty Medium Voltage with IEEE 841 Features

NEMA Premium



Volts: 2300/4000
HP: 200 - 500

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
400	1200	2300/4000	5011LL	**Q894**	5KS511XAA360	Y	
400	1200	2300/4000	5011L	**Q895**	5KS511XAA361	Y	148
450	3600	2300/4000	5011LS	**Q838**	5KS511XAA152	N	66, 90, 95, 112
450	3600	2300/4000	5011LS	**Q839**	5KS511XAA153	N	62, 90, 95, 112
450	1800	2300/4000	5011LL	**Q896**	5KS511XAA251	N	112
450	1800	2300/4000	5011L	**Q897**	5KS511XAA252	N	112, 148
450	1200	2300/4000	5013S	**Q898**	5KS513XAA326	N	
500	3600	2300/4000	5013ST	**Q840**	5KS513XAA126	N	66, 112
500	3600	2300/4000	5013ST	**Q841**	5KS513XAA127	N	62, 112
500	1800	2300/4000	5011LL	**Q8004**	5KS511XAA290	Y	
500	1800	2300/4000	5011L	**Q8005**	5KS511XAA291	Y	148
500	1800	2300/4000	5013S	**Q8000**	5KS513XAA232	Y	112
500	1200	2300/4000	5013S	**Q8002**	5KS513XAA328	Y	

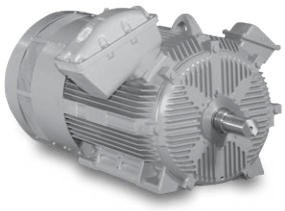
Notes:

62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
90 Does not meet IEEE 841 Bearing Temperature Rise
95 Class F Rise
112 Noise level exceeds IEEE 841
148 Roller bearing on drive-end. High strength shaft material. For belted loads only. Refer to model details for max radial load.

Quantum™ LMV—TEFC

Dimensions

NEMA Premium



Dimensions refer to drawings on following page

Frame 500, Totally Enclosed Fan Cooled

Frame	Shaft						Mounting					A	B	C	D[3]	G	J	K	L	O	P
	Keyway		Key Length	N-W	U[1]	V[2]	E	H	BA	2F	2XF										
	Width	Depth																			
507SS	0.625	0.313	3.50	5.50	2.625	5.25	10.00	1.07	8.50	25.00	22.00	23.00	31.90	63.63	12.50	1.35	7.09	8.36	37.88	30.80	30.45
508SS																					
507SLL	0.750	0.375	4.00	5.75	2.875	5.50	10.00	1.07	8.50	25.00	22.00	23.00	31.90	64.13	12.50	1.35	7.09	8.36	37.88	30.80	30.45
508SLL																					
507SL	1.000	0.500	8.00	9.50	4.000	9.25	10.00	1.07	8.50	25.00	22.00	23.00	31.90	67.88	12.50	1.35	7.09	8.36	37.88	30.80	30.45
508SL																					
508L	1.000	0.500	10.00	12.00	3.875	11.50	10.00	1.07	8.50	28.00	25.00	23.00	31.90	72.39	12.50	1.35	7.09	8.36	37.88	30.80	30.45
509L																					
508LL	0.875	0.438	5.00	6.75	3.375	6.50	10.00	1.07	8.50	28.00	25.00	23.00	31.90	67.14	12.50	1.35	7.09	8.36	37.88	30.80	30.45
509LL																					
508LS	0.625	0.313	4.00	5.75	2.625	5.50	10.00	1.07	8.50	28.00	25.00	23.00	31.90	66.14	12.50	1.35	7.09	8.36	37.88	30.80	30.45
509LS																					
5010L	1.000	0.500	10.00	12.00	3.875	11.50	10.00	1.07	8.50	36.00	32.00	23.00	39.90	80.39	12.50	1.35	7.09	10.00	41.88	30.80	30.45
5011L																					
5010LL	0.875	0.438	5.00	6.75	3.375	6.50	10.00	1.07	8.50	36.00	32.00	23.00	39.90	75.14	12.50	1.35	7.09	10.00	41.88	30.80	30.45
5011LL																					
5010LS	0.625	0.313	4.00	5.75	2.625	5.50	10.00	1.07	8.50	36.00	32.00	23.00	39.90	74.14	12.50	1.35	7.09	10.00	41.88	30.80	30.45
5011LS																					
5012S	1.000	0.500	5.50	7.75	3.875	7.50	10.00	1.07	8.50	45.00	40.00	23.00	48.90	85.14	12.50	1.35	7.09	10.00	46.38	30.80	30.45
5013S																					
5012ST	0.750	0.375	4.00	5.75	2.875	5.50	10.00	1.07	8.50	45.00	40.00	23.00	48.90	83.13	12.50	1.35	7.09	10.00	46.38	30.80	30.45
5013ST																					

Conduit Box Dimensions

Frame	Max. FL Amps[4]	Approx. Volume	AA	AB	XL	XN	R
507-5013	400	1260	2-4.00	22.67	12.39	16.25	35.14
	600	2500	2-4.00	22.98	14.50	23.95	35.63
	1200	5700	3-3.00	28.83	22.25	22.25	41.30

Notes:

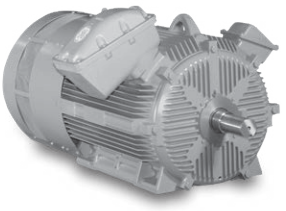
1 Tolerance on “U” dimension will be +0.000 inch - 0.001
2 Dimension “V” represents length of straight part of shaft extension
3 Tolerance on “D” dimension will be + 0.000 inch - 0.060 inch
4 Conduit box size is determined by full load amps

Providing mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward or from either side

Quantum™ LMV—TEFC

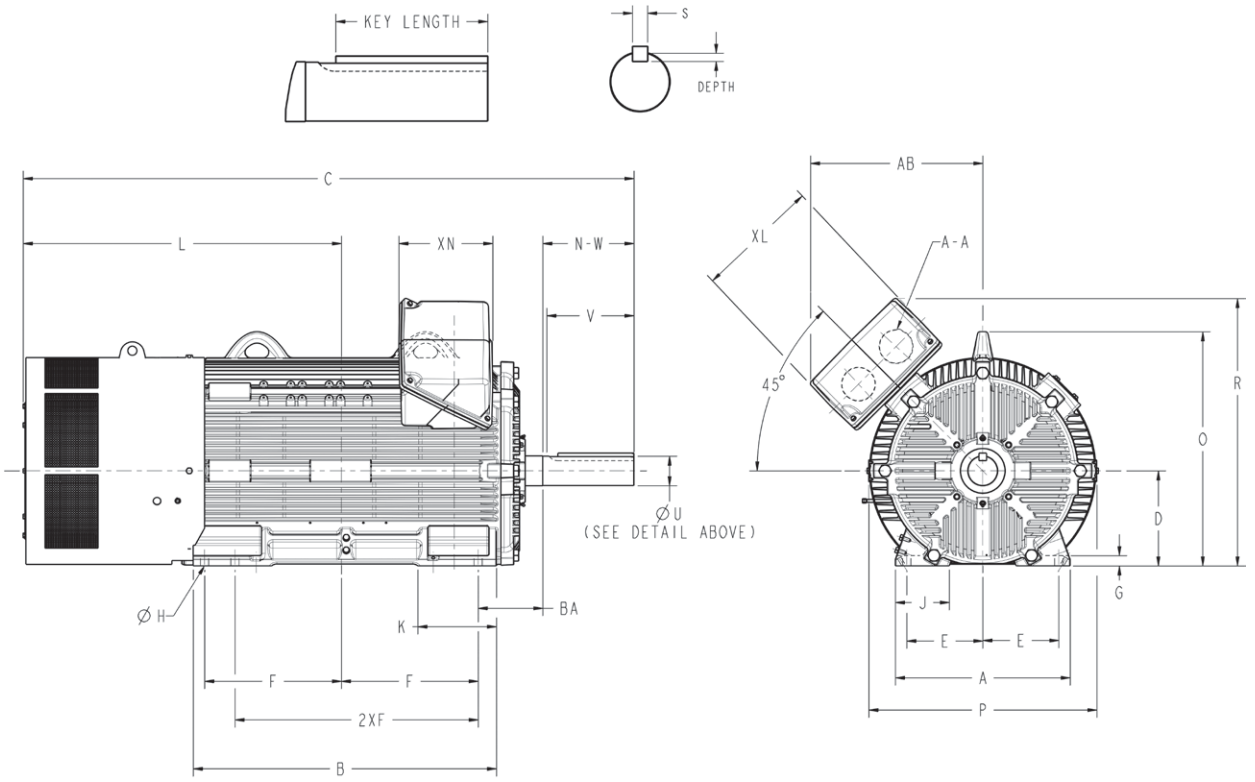
Dimensions

NEMA Premium



Frame dimensions on previous page

Frame 500, Totally Enclosed Fan Cooled

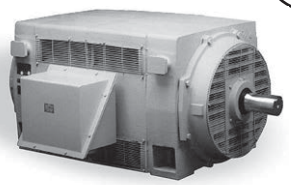


500 Frames (ODP, WPI, WPII)

Medium Voltage

Standard Features

NEMA Premium

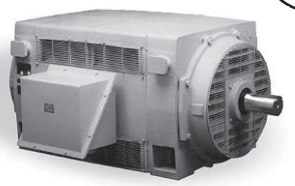


HP Range	200 - 1000
Poles	2, 4, 6
Voltage	2300/4000
Altitude	3300 ft
Ambient	40°C
Balance/Vibration	NEMA Grade A
Bearing Caps	Both ends
Bearing Temp Device	Provisions on DE and ODE Endshield; plugged
Bearing Type	Ball bearing: Sleeve bearing offered for 600HP and higher
Conduit Box	Plugged Fabricated Steel; Gasketed and rotatable in 90 degree increments
Div 2 Temp Codes	Self Certified Class I Div 2 Groups A, B, C, D T3 200C AIT (unless otherwise noted on price page)
Efficiency	Premium
Enclosure	ODP, WPI, WPII
End Shield	Cast Iron
Fasteners	SAE Grade 5, Zinc Plated
Frame Material	Cast Iron
Frame Size	509, 5011, 5013
Frequency	60Hz
Ground	In conduit box and 2 hole ground pad on frame
Insulation Class	Class F
Insulation System	Form coil epoxy VPI
Inverter Capabilities	Consult Factory
Lifting Means	Four (4) cast in lifting lugs
Lubrication	Polyurea Grease; Self Cooled Lube Oil offered for 600HP and higher
Mounting	Foot Mounted F1
Mounting Holes	One per foot
Nameplate	Stainless Steel
NEMA Design	Standard Torque
Paint	Epoxyester Buff
Relubrication	Yes, both ends
Rotor	Aluminium unless noted
Service Factor	1.15 (unless otherwise noted on pricing pages)
Shaft Material	ANSI 1045
Space Heater	Thermostatically controlled, 120V, 1-phase, leads to accessory box
Stator Temp Device	100 platinum RTD's, leads to accessory box
Temperature Rise	80°C @ 1.0 SF (unless otherwise noted on pricing pages) by resistance
Tests	NEMA routine
Time Rating	Continuous
Vertical Jack Screws	Provisions on frame
Warranty	12 months from date of installation or 18 months from date of manufacture, whichever occurs first

500 Frames (ODP and WPI Enclosure)

Medium Voltage with Ball Bearings

NEMA Premium



Volts: 2300/4000
HP: 200 - 1000

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
200	1800	2300/4000	509LL	**P151**	5KS509AAG201	N	
200	1200	2300/4000	509LL	**P152**	5KS509AAG301	N	
250	3600	2300/4000	509LS	**P153**	5KS509AAG101	N	
250	1800	2300/4000	509LL	**P154**	5KS509AAG202	N	
250	1200	2300/4000	509LL	**P155**	5KS509AAG302	N	
300	3600	2300/4000	509LS	**P156**	5KS509AAG102	N	
300	1800	2300/4000	509LL	**P157**	5KS509AAG203	N	
300	1200	2300/4000	5011LL	**P158**	5KS511AAG301	N	
350	3600	2300/4000	509LS	**P159**	5KS509AAG103	N	
350	1800	2300/4000	509LL	**P160**	5KS509AAG204	N	
350	1200	2300/4000	5011LL	**P161**	5KS511AAG302	N	
400	3600	2300/4000	509LS	**P162**	5KS509AAG104	N	
400	1800	2300/4000	509LL	**P163**	5KS509AAG205	N	
400	1200	2300/4000	5011LL	**P164**	5KS511AAG303	N	
450	3600	2300/4000	509LS	**P165**	5KS509AAG105	N	
450	1800	2300/4000	509LL	**P166**	5KS509AAG206	N	
450	1200	2300/4000	5011LL	**P167**	5KS511AAG304	N	
500	1800	2300/4000	5011LL	**P169**	5KS511AAG201	N	
500	1200	2300/4000	5011LL	**P170**	5KS511AAG305	N	
600	1800	2300/4000	5011LL	**P172**	5KS511AAG202	N	152
600	1200	2300/4000	5013S	**P173**	5KS513AAG301	N	
700	1800	2300/4000	5011LL	**P175**	5KS511AAG203	N	152
700	1200	2300/4000	5013S	**P176**	5KS513AAG302	N	
800	1800	2300/4000	5013S	**P178**	5KS513AAG201	N	152
800	1200	2300/4000	5013S	**P179**	5KS513AAG303	N	149
900	1800	2300/4000	5013S	**P181**	5KS513AAG202	N	152
900	1200	2300/4000	5013S	**P182**	5KS513AAG304	N	147, 149, 150
1000	1800	2300/4000	5013S	**P184**	5KS513AAG203	N	152

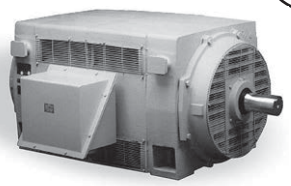
Notes:

147 Does not meet 200C AIT - 215C AIT and above only.
149 Class F rise @ 1.0 SF only.
150 Copper bar design. Design doesn't meet NEMA inertia requirements. Meets only 5554 LB-FT2 against 8590 LB-FT2 of NEMA value.
152 LRA/FLA Exceeds 6.5.

500 Frames (WPII Enclosure)

Medium Voltage with Ball Bearings

NEMA Premium



Volts: 2300/4000
HP: 200 - 1000

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
200	1800	2300/4000	509LL	**P251**	5KS509EAG201	N	
200	1200	2300/4000	509LL	**P252**	5KS509EAG301	N	
250	3600	2300/4000	509LS	**P253**	5KS509EAG101	N	
250	1800	2300/4000	509LL	**P254**	5KS509EAG202	N	
250	1200	2300/4000	509LL	**P255**	5KS509EAG302	N	
300	3600	2300/4000	509LS	**P256**	5KS509EAG102	N	
300	1800	2300/4000	509LL	**P257**	5KS509EAG203	N	
300	1200	2300/4000	5011LL	**P258**	5KS511EAG301	N	
350	3600	2300/4000	509LS	**P259**	5KS509EAG103	N	
350	1800	2300/4000	509LL	**P260**	5KS509EAG204	N	
350	1200	2300/4000	5011LL	**P261**	5KS511EAG302	N	
400	3600	2300/4000	509LS	**P262**	5KS509EAG104	N	
400	1800	2300/4000	509LL	**P263**	5KS509EAG205	N	
400	1200	2300/4000	5011LL	**P264**	5KS511EAG303	N	
450	3600	2300/4000	509LS	**P265**	5KS509EAG105	N	
450	1800	2300/4000	509LL	**P266**	5KS509EAG206	N	
450	1200	2300/4000	5011LL	**P267**	5KS511EAG304	N	
500	3600	2300/4000	509LS	**P285**	5KS509EAG142	N	
500	1800	2300/4000	5011LL	**P269**	5KS511EAG201	N	
500	1200	2300/4000	5011LL	**P270**	5KS511EAG305	N	
600	1800	2300/4000	5011LL	**P272**	5KS511EAG202	N	152
600	1200	2300/4000	5013S	**P273**	5KS513EAG301	N	
700	1800	2300/4000	5011LL	**P275**	5KS511EAG203	N	152
700	1200	2300/4000	5013S	**P276**	5KS513EAG302	N	
800	1800	2300/4000	5013S	**P278**	5KS513EAG201	N	152
800	1200	2300/4000	5013S	**P279**	5KS513EAG303	N	149
900	1800	2300/4000	5013S	**P281**	5KS513EAG202	N	152
900	1200	2300/4000	5013S	**P282**	5KS513EAG304	N	147, 149, 150
1000	1800	2300/4000	5013S	**P284**	5KS513EAG203	N	152

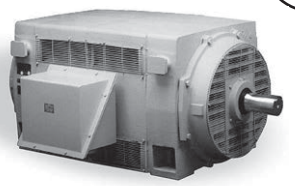
Notes:

147 Does not meet 200C AIT - 215C AIT and above only.
149 Class F rise @ 1.0 SF only.
150 Copper bar design. Design doesn't meet NEMA inertia requirements. Meets only 5554 LB-FT2 against 8590 LB-FT2 of NEMA value.
152 LRA/FLA Exceeds 6.5.

500 Frames (ODP and WPI Enclosure)

Medium Voltage with Sleeve Bearings

NEMA Premium



Volts: 2300/4000
HP: 600 - 1000

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
600	1800	2300/4000	5011LL	**P372**	5KS511AAG204	N	152
600	1200	2300/4000	5013LL	**P373**	5KS513AAG305	N	
700	1800	2300/4000	5011LL	**P375**	5KS511AAG205	N	152
700	1200	2300/4000	5013S	**P376**	5KS513AAG306	N	
800	1800	2300/4000	5013S	**P378**	5KS513AAG204	N	152
800	1200	2300/4000	5013S	**P379**	5KS513AAG307	N	149
900	1800	2300/4000	5013S	**P381**	5KS513AAG205	N	152
900	1200	2300/4000	5013S	**P382**	5KS513AAG308	N	147, 149, 150
1000	1800	2300/4000	5013S	**P384**	5KS513AAG206	N	152

500 Frames (WPII Enclosure)

Medium Voltage with Sleeve Bearings

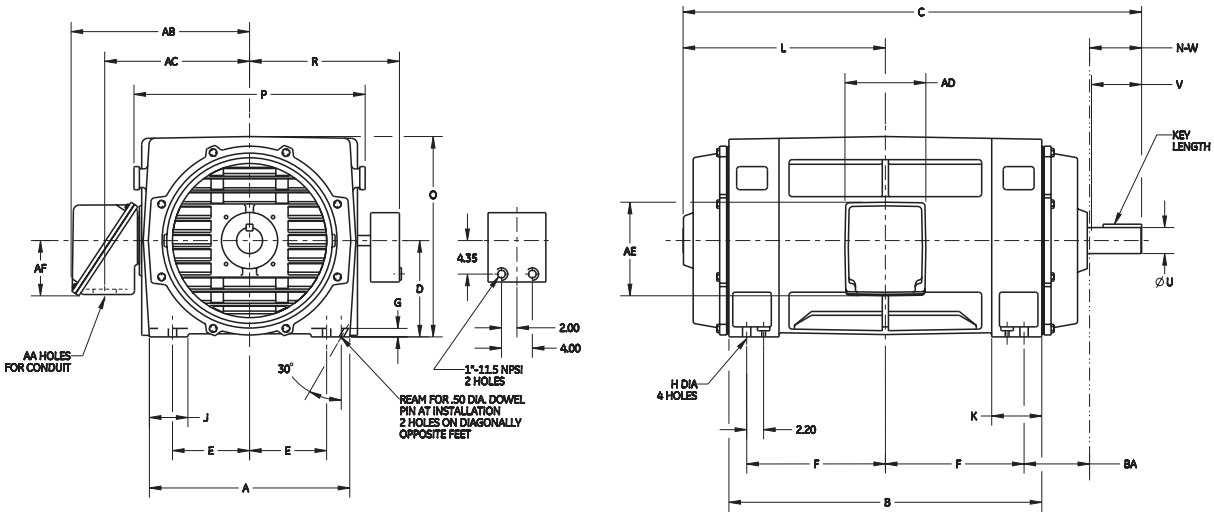
Volts: 2300/4000
HP: 600 - 1000

HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
600	1800	2300/4000	5011LL	**P472**	5KS511EAG204	N	152
600	1200	2300/4000	5013LL	**P473**	5KS513EAG305	N	
700	1800	2300/4000	5011LL	**P475**	5KS511EAG205	N	152
700	1200	2300/4000	5013S	**P476**	5KS513EAG306	N	
800	1800	2300/4000	5013S	**P478**	5KS513EAG204	N	152
800	1200	2300/4000	5013S	**P479**	5KS513EAG307	N	149
900	1800	2300/4000	5013S	**P481**	5KS513EAG205	N	152
900	1200	2300/4000	5013S	**P482**	5KS513EAG308	N	147, 149, 150
1000	1800	2300/4000	5013S	**P484**	5KS513EAG206	N	152

Notes:
147 Does not meet 200C AIT - 215C AIT and above only.
149 Class F rise @ 1.0 SF only.
150 Copper bar design. Design doesn't meet NEMA inertia requirements. Meets only 5554 LB-FT2 against 8590 LB-FT2 of NEMA value.
152 LRA/FLA Exceeds 6.5.

500 Frame (WPI)
Medium Voltage

Dimensions



Frame 500

Frame	Shaft						Mounting					A	B	C	G	J	K	L	O	P	R
	Keyway		Key Length	N-W	U[1]	V[2]	BA	D[3]	E	F	H										
	Width	Depth																			
509L	1.000	0.500	10.00	12.00	3.875	11.75	8.50	12.50	10.00	14.00	1.06	26.00	32.60	56.75	1.10	5.00	6.50	22.25	26.00	30.00	19.70
509LS	0.625	0.312	4.00	5.75	2.625	5.50	8.50	12.50	10.00	14.00	1.06	26.00	32.60	50.50	1.10	5.00	6.50	22.25	26.00	30.00	19.70
509LL	0.875	0.437	5.00	6.75	3.375	6.50	8.50	12.50	10.00	14.00	1.06	26.00	32.60	51.50	1.10	5.00	6.50	22.25	26.00	30.00	19.70
5011L	1.000	0.500	10.00	12.00	3.875	11.75	8.50	12.50	10.00	18.00	1.06	23.00	40.60	64.75	1.10	5.00	6.50	26.25	26.00	30.00	19.70
5011LS	0.625	0.312	4.00	5.75	2.625	5.50	8.50	12.50	10.00	18.00	1.06	26.00	40.60	58.50	1.10	5.00	6.50	26.25	26.00	30.00	19.70
5011LL	0.875	0.437	5.00	6.75	3.375	6.50	8.50	12.50	10.00	18.00	1.06	26.00	40.60	59.50	1.10	5.00	6.50	26.25	26.00	30.00	19.70
5013ST	0.750	0.375	4.00	5.75	2.875	5.50	8.50	12.50	10.00	22.50	1.06	26.00	49.60	67.50	1.10	5.00	6.50	30.75	26.00	30.00	19.70
5013S	1.000	0.500	5.50	7.75	3.875	7.50	8.50	12.50	10.00	22.50	1.06	26.00	49.60	69.50	1.10	5.00	6.50	30.75	26.00	30.00	19.70

Conduit Box Dimensions

Frame	Max. FL Amps[5]	Approx. Volume	AA	AB	AC	AD	AE	AF
508-5013	250	700	4.00 NPT	23.00	18.75	10.00	12.13	7.00
	400	1260	2-4.00 NPT	23.50	18.75	16.25	12.35	7.00
	600	2500	2-4.00 NPT	31.50	26.25	12.00	22.68	14.20
	1200	5700	3-3.00 NPT	35.60	28.50	20.00	20.00	10.87

Notes:

1 Tolerance on “U” dimension will be +0.000 inch - 0.001 inch
2 Dimension “V” represents length of straight part of shaft extension
3 Tolerance on “D” dimension will be + 0.000 inch - 0.060 inch
5 Conduit box size is determined by full load amps

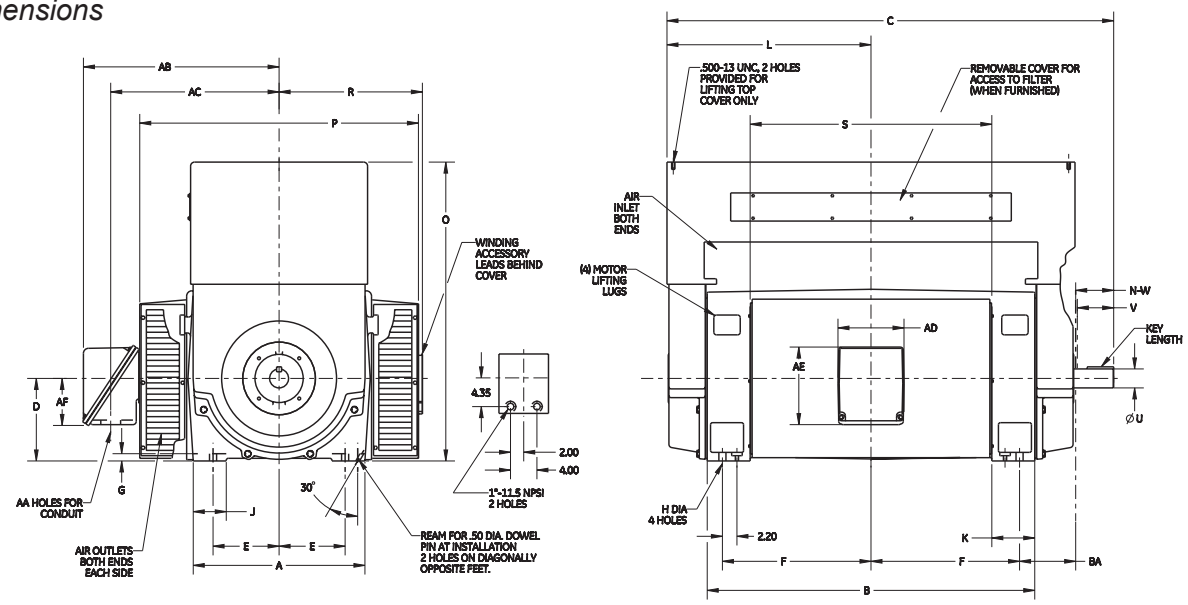
Providing mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward or from either side

Motors are depicted with representative conduit box. For specific dimensions or a complete motor outline drawing contact your Emporium Energy representative.

500 Frame (WPII)

Medium Voltage

Dimensions



Frame 500

Frame	Shaft						Mounting					A	B	C	G	J	K	L	O	P	R	S
	Keyway		Key																			
	Width	Depth	Length	N-W	U[1]	V[2]	BA	D[3]	E	F	H											
509L	1.000	0.500	10.00	12.00	3.875	11.75	8.50	12.50	10.00	14.00	1.06	26.00	32.60	56.90	1.10	5.00	6.50	22.40	45.26	42.20	21.70	19.50
509LS	0.625	0.312	4.00	5.75	2.625	5.50	8.50	12.50	10.00	14.00	1.06	26.00	32.60	50.65	1.10	5.00	6.50	22.40	45.26	42.20	21.70	19.50
509LL	0.875	0.437	5.00	6.75	3.375	6.50	8.50	12.50	10.00	14.00	1.06	26.00	32.60	51.65	1.10	5.00	6.50	22.40	45.26	42.20	21.70	19.50
5011L	1.000	0.500	10.00	12.00	3.875	11.75	8.50	12.50	10.00	18.00	1.06	26.00	40.60	64.90	1.10	5.00	6.50	26.40	45.26	42.20	21.70	27.50
5011LS	0.625	0.312	4.00	5.75	2.625	5.50	8.50	12.50	10.00	18.00	1.06	26.00	40.60	58.65	1.10	5.00	6.50	26.40	45.26	42.20	21.70	27.50
5011LL	0.875	0.437	5.00	6.75	3.375	6.50	8.50	12.50	10.00	18.00	1.06	26.00	40.60	59.65	1.10	5.00	6.50	26.40	45.26	42.20	21.70	27.50
5013ST	0.750	0.375	4.00	5.75	2.875	5.50	8.50	12.50	10.00	22.50	1.06	26.00	49.60	67.60	1.70	5.00	6.50	30.90	45.26	42.20	21.70	36.50
5013S	1.000	0.500	5.50	7.75	3.875	7.50	8.50	12.50	10.00	22.50	1.06	26.00	49.60	69.65	1.70	5.00	6.50	30.90	45.26	42.20	21.70	36.50

Conduit Box Dimensions

Frame	Max. FL Amps[5]	Approx. Volume	AA	AB	AC	AD	AE	AF
508-5013	250	700	4.00 NPT	29.60	25.30	10.00	12.13	7.00
	400	1260	2-4.00 NPT	29.60	25.30	16.25	12.35	7.00
	600	2500	2-4.00 NPT	31.50	26.25	12.00	22.68	14.20
	1200	5700	3-3.00 NPT	35.60	28.50	20.00	20.00	10.87

Notes:

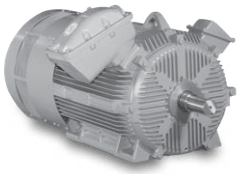
1 Tolerance on “U” dimension will be +0.000 inch - 0.001 inch
2 Dimension “V” represents length of straight part of shaft extension
3 Tolerance on “D” dimension will be + 0.000 inch - 0.060 inch
5 Conduit box size is determined by full load amps

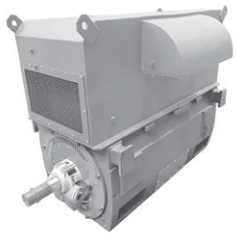
Providing mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward or from either side

Motors are depicted with representative conduit box. For specific dimensions or a complete motor outline drawing contact your Emporium Energy representative.

Quantum™ 440, 500, and 580 TEFC and WPII 2-Pole Surface Pump Systems

NEMA Premium





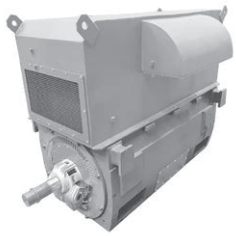
Standard Features

Enclosure	TEFC	WPII
HP Range	125 - 800	1250 - 1500
Poles	2	2
Voltage	460	4160
Altitude	3300 ft	3300 ft
Ambient	40°C	40°C
Balance/Vibration	NEMA Grade B	NEMA Grade A
Bearing Caps	Both Ends	Both Ends
Bearing Protection	IP55; Shaft slinger both ends	DE Shaft Slinger (500)
Bearing Temperature Sensing	Provisions on DE and ODE; plugged	100 ohm Platinum RTD both bearings
Bearing Type	Single Shielded Ball	Insulated Bearing or End Shield both ends.
Conduit Box	Cast Iron or Fabricated Steel; Gasketed and rotatable in 90 degree increments	Cast Iron or Fabricated Steel; Gasketed and rotatable in 90 degree increments
Div 2 Temp Codes	Class I Division 2	Class I Division 2
Drains	Stainless Steel T-drains in lowest section of both end shields	–
Efficiency	Premium	Premium
End Shield	Cast Iron	Cast Iron
Fan	Aluminum unidirectional	–
Fan Cover	Fabricated Steel	–
Fasteners	SAE Grade 5	SAE Grade 5
Frame Material	Cast Iron	Cast Iron
Frame Sizes	5011-5013	5013-5811
Frequency	60 Hz	60 Hz
Ground	Ground in conduit box and 2 NEMA Type ground pads on frame	Ground in conduit box and 2 NEMA Type ground pads on frame
Insulation Class	Class F	Class F
Insulation System	Epoxy VPI	Epoxy VPI
Inverter Capabilities	Yes	Yes
Bearing L10 Life	Direct Coupled - 65,000 hrs	Direct Coupled - 65,000 hrs
Leads	Permanently numbered, Non-wicking	Permanently numbered, Non-wicking
Lifting Means	Two (2) cast-in lifting lugs	Four (4) cast-in lifting lugs
Lubrication	Polyurea Grease (Anti-friction)	Polyurea Grease (Anti-friction)
Mounting	Foot mounted F1 only	Foot mounted F1 only
Mounting Holes	Dual drilled for 5010/5011, 5012/5013 mounting	Dual drilled only on 5810/5811
Nameplate	316 Stainless Steel	316 Stainless Steel
NEMA Design	Standard Torque	Standard Torques
Paint	Epoxyester Buff	Epoxyester Buff
Relubrication	Yes, both ends	Yes, both ends
Service Factor	1.15 (unless otherwise noted on pricing pages)	1.15 (unless otherwise noted on pricing pages)
Shaft Material	AISI 1045 (5800 is 4142)	AISI 1045 (5800 is 4142)
Space Heater	115 (115/230V on 5800 frame) thermostatically controlled, leads to accessory box	115 (115/230V on 5800 frame) thermostatically controlled, leads to accessory box
Temperature Rise	Class B Rise @ 1.0 SF (unless otherwise noted on pricing pages)	Class B Rise @ 1.0 SF (unless otherwise noted on pricing pages)
Tests	NEMA Routine IEEE 112 Method B (5800 is Method F)	NEMA Routine IEEE 112 Method B (5800 is Method F)
Time Rating	Continuous	Continuous
Vibration Pads	Cast-in vibration pads for repeatable measurements	Cast-in vibration pads for repeatable measurements
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first on 5000 frames (24/30 on 5800 frames)	36 months from date of installation or 42 months from date of manufacture, whichever occurs first on 5000 frames (24/30 on 5800 frames)
Winding Protection	100 ohm winding RTDs, leads to accessory box	100 ohm winding RTDs, leads to accessory box

Quantum™ 440, 500, and 580 TEFC and WPII 2-Pole Surface Pump Systems

NEMA Premium





CW Rotation Models (facing ODE)

- 100 ohm winding RTDs to accessory conduit box (included on 500 frame and higher, provisions only on 440 frame)
- 115V space heaters (same access box on WPII, second accessory conduit box on TEFC)
- 100 ohm bearing RTDs (supplied on WPII, provisions on TEFC)
- Both bearings insulated (350HP and higher)
- Stainless steel air filters (WPII only)
- Air pressure differential switch (WPII only)

Volts: 460, 4160
HP: 125 - 1500

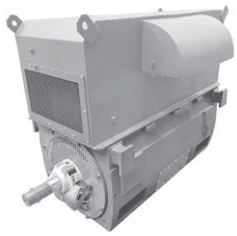
HP	RPM	Volts	Frame	Enclosure	Mot Rot	Cat. No.	Model No.	Normally Stocked	CCW Fan Part No.	Notes
125	3600	460	444	TEFC	Both	**H9789**	5KAF444SAA120	N	–	
150	3600	460	445	TEFC	Both	**H9790**	5KAF445SAA124	N	–	
200	3600	460	447	TEFC	Both	**H9791**	5KAF447SAA126	N	–	
250	3600	460	449	TEFC	CW	**H9792**	5KAF449SAA122	N	–	
300	3600	460	449	TEFC	CW	**H9793**	5KAF449SAA123	N	–	
350	3600	460	449	TEFC	CW	**H9794**	5KAF449SAA121	N	–	
350	3600	460	5011	TEFC	CW	**H5240**	5KAF511SAA122	N	148C8068AA1	
400	3600	460	449	TEFC	CW	**H9795**	5KAF449SAH120	N	–	
400	3600	460	5011	TEFC	CW	**H5241**	5KAF511SAA123	Y	148C8068AA1	
450	3600	460	5011	TEFC	CW	**H5242**	5KAF511SAA124	Y	148C8068AA1	
500	3600	460	5011	TEFC	CW	**H5243**	5KAF511SAA125	Y	148C8068AA1	
600	3600	460	5013	TEFC	CW	**H5244**	5KAF513SAA132	Y	148C8068AA1	
700	3600	460	5013	TEFC	CW	**H5263**	5KAF513SAA133	N	148C8068AA1	149
700	3600	4160	509LS	WPII	Both	**H5020**	5KS509EAA126	Y	–	
800	3600	460	5013	TEFC	CW	**H0001**	5KAF513SAA134	Y	148C8068AA1	149
800	3600	4160	509LS	WPII	Both	**H5021**	5KS509EAA125	Y	–	
900	3600	4160	5011ST	WPII	Both	**H5022**	5KS511EAA133	Y	–	
1000	3600	4160	5011ST	WPII	Both	**H5023**	5KS511EAA132	Y	–	
1250	3600	4160	5013ST	WPII	CW	**H5025**	5KS513EAA124	Y	–	
1250	3600	4160	5811	WPII	CW	**H5804**	5KS583EAM141	Y	–	
1500	3600	4160	5811	WPII	CW	**H5805**	5KS583EAM140	Y	–	149

Notes:
149 Class F rise @ 1.0 SF only

Quantum™ 440, 500, and 580 TEFC and WPII 2-Pole Surface Pump Systems

NEMA® Premium





CCW Rotation Models (facing ODE)
- 100 ohm winding RTDs and 115V space heater leads to same accessory box (included on 500 frame, provisions only on 440 frame)
- Provisions for bearing RTDs (TEFC), 100 ohm bearing RTDs supplied (WPII)
- Only opposite drive-end bearing insulated (TEFC), both bearing brackets insulated (WPII) (300HP and higher only)
- Stainless steel air filters (WPII only)
- Air pressure differential switch (WPII only)

Volts: 460, 4160
HP: 125 - 1500

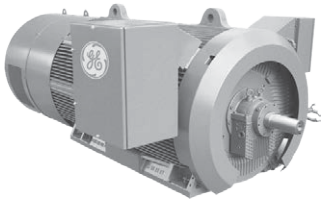
HP	RPM	Volts	Frame	Enclosure	Mot Rot	Cat. No.	Model No.	Normally Stocked	CW Fan Part No.	Notes
125	3600	460	444	TEFC	CCW	**H9511**	5KAF444SAA121	N	–	
150	3600	460	445	TEFC	CCW	**H9512**	5KAF445SAA126	N	–	
200	3600	460	447	TEFC	CCW	**H9961**	5KAF447SAA127	N	–	
250	3600	460	449	TEFC	CCW	**H9996**	5KAF449SAA128	N	–	
300	3600	460	449	TEFC	CCW	**H9398**	5KAF449SAA125	N	–	
350	3600	460	449	TEFC	CCW	**H9796**	5KAF449SAA126	N	–	
350	3600	460	5011	TEFC	CCW	**H527**	5KAF511SAA127	N	148C8070AA1	
400	3600	460	449	TEFC	CCW	**H9797**	5KAF449SAH121	N	–	
400	3600	460	5011	TEFC	CCW	**H528**	5KAF511SAA128	N	148C8070AA1	
450	3600	460	5011	TEFC	CCW	**H529**	5KAF511SAA129	N	148C8070AA1	
500	3600	460	5011	TEFC	CCW	**H530**	5KAF511SAA130	N	148C8070AA1	
600	3600	460	5013	TEFC	CCW	**H531**	5KAF513SAA135	Y	148C8070AA1	
700	3600	460	5013	TEFC	CCW	**H564**	5KAF513SAA136	N	148C8070AA1	149
700	3600	4160	509LS	WPII	Both	**H5020**	5KS509EAA126	Y	–	
800	3600	460	5013	TEFC	CCW	**H5070**	5KAF513SAA137	Y	148C8070AA1	149
800	3600	4160	509LS	WPII	Both	**H5021**	5KS509EAA125	Y	–	
900	3600	4160	5011ST	WPII	Both	**H5022**	5KS511EAA133	Y	–	
1000	3600	4160	5011ST	WPII	Both	**H5023**	5KS511EAA132	Y	–	
1250	3600	4160	5013ST	WPII	CCW	**H5024**	5KS513EAA125	N	–	
1250	3600	4160	5811	WPII	CCW	**H5802**	5KS583EAM127	Y	–	
1500	3600	4160	5811	WPII	CCW	**H5803**	5KS583EAM126	Y	–	149

Notes:
149 Class F rise @ 1.0 SF only

Quantum™ 580/7000

Medium Voltage TEFC

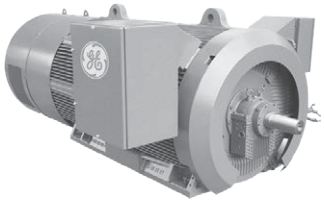
Standard Features



HP Range	700 - 1750
Poles	2, 4, 6
Voltage	2300/4000
Altitude	3300 ft
Ambient	40°C to -20°C
Balance/Vibration	NEMA Grade A
Bearing Insulation	Insulated bearing with grounding strap for Sleeve Bearings Insulated bearing brackets on both ends for Anti-Friction Bearings
Bearing Protection	Grease retainer on both ends (Anti-Friction Bearings) Labyrinth seals on both ends (Sleeve Bearings)
Bearing Temp Device	100 Ohm Platinum RTD both bearings
Bearing Type	Antifriction Bearings, 2-Pole 5811/5812/7011 Sleeve Bearings
Bearing L10 Life	Direct Coupled 100,000 hrs
Conduit Box	Fabricated Steel; Gasketed and rotatable in 90 degree increments
Div 2 Temp Codes	Self Certified Class I Div 2 Groups A, B, C, D T3 200C AIT (unless otherwise noted on price page)
Efficiency	NEMA Premium
Enclosure	TEFC (IP 55)
End Shield	Gray Cast Iron, Frame 5809/5810/5811/5812 Grade 30, Frame 7010/7011 Grade 60
Fan	Bi-Directional; Uni-directional for 2 poles (unless otherwise noted on price page)
Fan Cover	Fabricated Steel
Fasteners	SAE Grade 5, Zinc chromate coated
Frame Material	Gray Cast Iron, Frame 5809/5810/5811/5812 Grade 30, Frame 7010/7011 Grade 60
Frame Size	5809, 5810, 5811, 5812, 7010, 7011
Frequency	60 Hz
Ground	Ground in main conduit box and 2 holes diagonally opposite on frame feet.
Insulation Class	Class F
Insulation System	Form coil epoxy VPI
Inverter Capabilities	Consult Factory
Leads	Permanently numbered, Non-wicking
Lifting Means	Two (2) cast in lifting lugs
Lubrication	Mobil PolyRex EM Grease; Self Cooled Lube Oil up to 40 deg C
Mounting	Foot Mounted F1
Mounting Holes	Dual drilled for 5809/5810, 5811/5812 mounting , Single drilled 7010, 7011
Nameplate	304 Stainless Steel
NEMA Design	NEMA MG-1, Part 20 Standard Torques
Paint	Frame 5809, 5810, 5811, 5812 Epoxyester Buff Frame 7010, 7011 Epoxyester Dark Grey
Relubrication	Yes, both ends; extended through the fan cover
Rotor	Copper bar
Service Factor	1.15 (unless otherwise noted on pricing pages)
Shaft Material	AISI 4142
Space Heater	120V Space heater, leads to accessory box
Stator Temp Device	100 platinum RTD's (total of 6, 2 per phase), leads to accessory box
Temperature Rise	90°C @ 1.0 SF (unless otherwise noted on pricing pages) by resistance
Tests	NEMA routine, IEEE 112
Time Rating	Continuous
Vertical Jack Screws	Provisions on Frame
Warranty	12 months from date of installation or 18 months from date of manufacture, whichever occurs first

Quantum™ 580/7000

Medium Voltage TEFC with Anti-friction Bearings



Volts: 2300/4000
HP: 700 - 1750

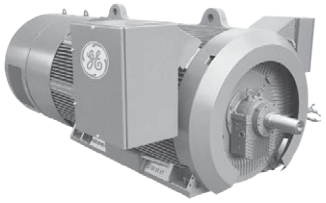
HP	RPM	Volts	Frame	Cat. No.	Model No.	Normally Stocked	Notes
700	3600	2300/4000	5810	**T58101**	5KS582SAM102	N	35, 66
700	3600	2300/4000	5810	**T58102**	5KS582SAM103	N	35, 62
700	1800	2300/4000	5810	**T58201**	5KS582SAM201	N	
700	1200	2300/4000	5810	**T58301**	5KS582SAM301	N	35
800	3600	2300/4000	7010	**Q7103**	5KS701SAK102	N	66
800	3600	2300/4000	7010	**Q7104**	5KS701SAK106	N	62
800	1800	2300/4000	5810	**T58203**	5KS582SAM202	N	35
800	1200	2300/4000	5812	**T58303**	5KS584SAM301	N	35
900	3600	2300/4000	7010	**Q7105**	5KS701SAK103	N	35, 66, 151
900	3600	2300/4000	7010	**Q7106**	5KS701SAK107	N	35, 62, 151
900	1800	2300/4000	5812	**T58205**	5KS584SAM202	N	35
900	1200	2300/4000	5812	**T58305**	5KS584SAM302	N	35, 66
900	1200	2300/4000	5812	**T58306**	5KS584SAM303	N	35, 62
1000	1800	2300/4000	5812	**T58207**	5KS584SAM203	N	35
1000	1200	2300/4000	7011	**Q7303**	5KS702SAK302	N	
1250	1800	2300/4000	5812	**T58209**	5KS584SAM204	N	66, 146, 149
1250	1800	2300/4000	5812	**T58210**	5KS584SAM205	N	62, 146, 149
1250	1200	2300/4000	7011	**Q7304**	5KS702SAK303	N	
1500	1800	2300/4000	7011	**Q7205**	5KS702SAK202	N	
1500	1200	2300/4000	7011	**Q7305**	5KS702SAK304	N	146, 149
1750	1800	2300/4000	7011	**Q7207**	5KS702SAK203	N	146, 149

Notes:

35 Does not meet 200C AIT (T3) - 230C AIT (T2C) and above only
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
146 Does not meet 200C AIT (T3) - 260C AIT (T2B) and above only
149 Class F rise @ 1.0 SF only
151 Suitable to 1.0 and 1.15 SF with Class F rise

Quantum™ 580/7000

Medium Voltage TEFC with Sleeve Bearings



Volts: 2300/4000
HP: 700 - 1750

HP	RPM	Volts	Frame	Cat. No.	Model No.		Normally Stocked	Notes
700	3600	2300/4000	5810	**T58103**	5KS582SAM104		N	35, 66
700	3600	2300/4000	5810	**T58104**	5KS582SAM105		N	35, 62
700	1800	2300/4000	5810	**T58202**	5KS582SAM204		N	
700	1200	2300/4000	5810	**T58302**	5KS582SAM302		N	35
800	3600	2300/4000	5812	**T58105**	5KS584SAM102	Contact dealer	N	35, 66
800	3600	2300/4000	5812	**T58106**	5KS584SAM103	Contact dealer	N	35, 62
800	1800	2300/4000	5810	**T58204**	5KS582SAM205		N	35
800	1200	2300/4000	5812	**T58304**	5KS584SAM304		N	35
900	3600	2300/4000	5812	**T58107**	5KS584SAM104	Contact dealer	N	35, 66
900	3600	2300/4000	5812	**T58108**	5KS584SAM105	Contact dealer	N	35, 62
900	1800	2300/4000	5812	**T58206**	5KS584SAM206		N	35
900	1200	2300/4000	5812	**T58307**	5KS584SAM305		N	35, 66
900	1200	2300/4000	5812	**T58308**	5KS584SAM306		N	35, 62
1000	3600	2300/4000	5812	**T58109**	5KS584SAM106	Contact dealer	N	35, 66, 149
1000	3600	2300/4000	5812	**T58110**	5KS584SAM107	Contact dealer	N	35, 62, 149
1000	1800	2300/4000	5812	**T58208**	5KS584SAM207		N	35
1250	3600	2300/4000	7011	**Q7109**	5KS702SAK103		N	66
1250	3600	2300/4000	7011	**Q7110**	5KS702SAK107		N	62
1250	1800	2300/4000	5812	**T58211**	5KS584SAM208		N	66, 146, 149
1250	1800	2300/4000	5812	**T58212**	5KS584SAM209		N	62, 146, 149
1500	3600	2300/4000	7011	**Q7111**	5KS702SAK104		N	35, 66, 151
1500	3600	2300/4000	7011	**Q7112**	5KS702SAK108		N	35, 62, 151
1500	1800	2300/4000	7011	**Q7206**	5KS702SAK206		N	
1750	1800	2300/4000	7011	**Q7208**	5KS702SAK207		N	146, 149

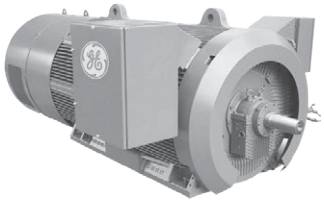
Notes:

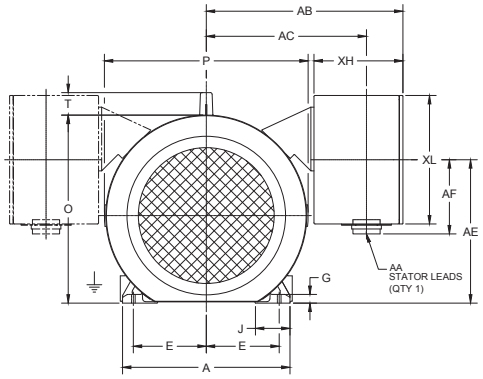
35 Does not meet 200C AIT (T3) - 230C AIT (T2C) and above only
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
146 Does not meet 200C AIT (T3) - 260C AIT (T2B) and above only
149 Class F rise @ 1.0 SF only
151 Suitable to 1.0 and 1.15 SF with Class F rise

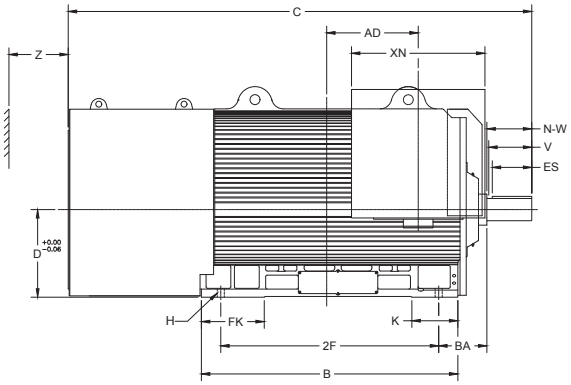
Quantum™ 580/7000

Medium Voltage TEFC with Anti-friction Bearings

Dimensions







Frame	Poles	Shaft						Mounting				A	B	C	D[3]	G	J	K	FK	O	T	P
		Keyway		Key Length	N-W	U[1]	V[2]	E	H∅	BA	2F											
		Width	Depth																			
5809	2	0.875	0.505	5.00	6.75	3.375	6.70	11.50	1.10	10.00	32.00	30.72	46.50	87.00	14.50	1.35	6.35	8.80	16.30	32.10	4.20	37.30
	4-8	1.000	0.585	6.50	8.00	4.125	7.75	11.50	1.10	10.00	32.00	30.72	46.50	87.00	14.50	1.35	6.35	8.80	16.30	32.10	4.20	37.30
5810	2	0.875	0.505	5.00	6.75	3.375	6.70	11.50	1.10	10.00	36.00	30.72	46.50	87.00	14.50	1.35	6.35	8.80	16.30	32.10	4.20	37.30
	4-8	1.000	0.585	6.50	8.00	4.125	7.75	11.50	1.10	10.00	36.00	30.72	46.50	87.00	14.50	1.35	6.35	8.80	16.30	32.10	4.20	37.30
5811	4-8	1.000	0.585	8.00	10.00	4.125	9.75	11.50	1.10	10.00	40.00	30.72	54.00	98.50	14.50	1.35	6.35	8.80	16.10	32.10	4.20	37.30
5812	4-8	1.000	0.585	8.00	10.00	4.125	9.75	11.50	1.10	10.00	45.00	30.72	54.00	98.50	14.50	1.35	6.35	8.80	16.10	32.10	4.20	37.30
7010	2	0.875	0.515	5.00	6.75	3.375	6.50	14.77	1.38	9.00	44.10	33.90	51.90	107.00	17.72	1.75	7.00	9.30	12.70	38.00	5.00	41.00
	4-12	1.000	0.580	6.50	8.00	4.500	7.75	14.77	1.38	9.00	44.10	33.90	51.90	121.50	17.72	1.75	7.00	9.30	12.70	38.00	5.00	41.00
7011	4-12	1.000	0.580	6.50	8.00	4.500	7.75	14.77	1.38	9.00	49.21	33.90	57.50	135.50	17.72	1.75	7.00	9.30	13.50	38.00	5.00	41.00

Conduit Box Dimensions

Frame	Voltage	AA	AB	AC	AD	AE	AF	XL	XN	XH
5809/5810	<= 4.1 kV	4" NPT	38.50	31.00	9.75	24.30	15.00	27.72	28.74	17.00
5811/5812	<= 4.1 kV	4" NPT	38.50	31.00	13.00	24.30	15.00	27.72	28.74	17.00
7010	<= 4.1 kV	4" NPT	41.00	32.50	18.50	29.00	15.00	26.00	27.00	18.00
7011	<= 4.1 kV	4" NPT	41.00	32.50	25.00	29.00	15.00	26.00	27.00	18.00

Notes:

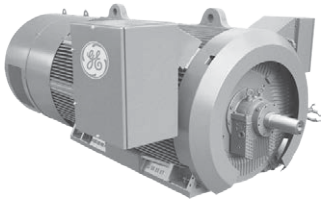
1 Tolerance on “U” dimension will be +0.000 inch -0.001 inch
2 Dimension “V” represents length of straight part of shaft extension
3 Tolerance on “D” dimension will be +0.000 inch -0.060 inch

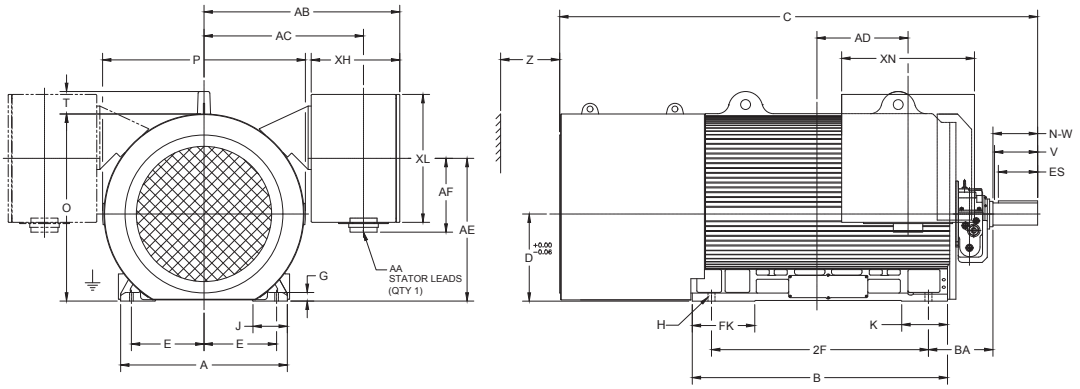
Minimum clearance required for air inlet Z = 12"

Quantum™ 580/7000

Medium Voltage TEFC with Sleeve Bearings

Dimensions





Frame	Poles	Shaft						Mounting				A	B	C	D[3]	G	J	K	FK	O	T	P
		Keyway		Key Length	N-W	U[1]	V[2]	E	H∅	BA	2F											
		Width	Depth																			
5809	2	0.875	0.505	5.00	6.75	3.375	6.70	11.50	1.10	10.00	32.00	30.72	46.50	89.00	14.50	1.35	6.35	8.80	16.30	32.10	4.20	37.30
	4-8	1.000	0.585	6.50	8.00	4.125	7.75	11.50	1.10	13.50	32.00	30.72	46.50	100.00	14.50	1.35	6.35	8.80	16.30	32.10	4.20	37.30
5810	2	0.875	0.505	5.00	6.75	3.375	6.70	11.50	1.10	10.00	36.00	30.72	46.50	89.00	14.50	1.35	6.35	8.80	16.30	32.10	4.20	37.30
	4-8	1.000	0.585	6.50	8.00	4.125	7.75	11.50	1.10	13.50	36.00	30.72	46.50	100.00	14.50	1.35	6.35	8.80	16.30	32.10	4.20	37.30
5811	2	0.875	0.505	5.00	6.75	3.375	6.70	11.50	1.10	10.00	40.00	30.72	54.00	104.00	14.50	1.35	6.35	8.80	16.10	32.10	4.20	37.30
	4-8	1.000	0.585	8.00	10.00	4.125	9.75	11.50	1.10	13.50	40.00	30.72	54.00	109.00	14.50	1.35	6.35	8.80	16.10	32.10	4.20	37.30
5812	2	0.875	0.505	5.00	6.75	3.375	6.70	11.50	1.10	10.00	45.00	30.72	54.00	104.00	14.50	1.35	6.35	8.80	16.10	32.10	4.20	37.30
	4-8	1.000	0.585	8.00	10.00	4.125	9.75	11.50	1.10	13.50	45.00	30.72	54.00	109.00	14.50	1.35	6.35	8.80	16.10	32.10	4.20	37.30
7010	2	0.875	0.515	5.00	6.75	3.375	6.50	14.77	1.38	13.20	44.10	33.90	51.90	111.00	17.72	1.75	7.00	9.30	12.70	38.00	5.00	41.00
	4-12	1.000	0.580	6.50	8.00	4.500	7.75	14.77	1.38	16.50	44.10	33.90	51.90	129.00	17.72	1.75	7.00	9.30	12.70	38.00	5.00	41.00
7011	2	0.875	0.515	5.00	6.75	3.375	6.50	14.77	1.38	13.20	49.21	33.90	57.50	130.00	17.72	1.75	7.00	9.30	13.50	38.00	5.00	41.00
	4-12	1.000	0.580	6.50	8.00	4.500	7.75	14.77	1.38	16.50	49.21	33.90	57.50	143.00	17.72	1.75	7.00	9.30	13.50	38.00	5.00	41.00

Conduit Box Dimensions

Frame	Voltage	AA	AB	AC	AD	AE	AF	XL	XN	XH
5809/5810	<= 4.1 kV	4" NPT	38.50	31.00	9.75	24.30	15.00	27.72	28.74	17.00
5811/5812	<= 4.1 kV	4" NPT	38.50	31.00	13.00	24.30	15.00	27.72	28.74	17.00
7010	<= 4.1 kV	4" NPT	41.00	32.50	18.50	26.00	27.00	26.00	27.00	18.00
7011	<= 4.1 kV	4" NPT	41.00	32.50	25.00	26.00	27.00	26.00	27.00	18.00

Notes:

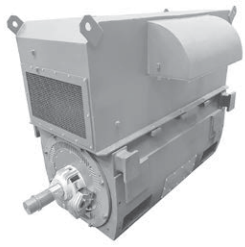
1 Tolerance on “U” dimension will be +0.000 inch -0.001 inch
2 Dimension “V” represents length of straight part of shaft extension
3 Tolerance on “D” dimension will be +0.000 inch -0.060 inch

Minimum clearance required for air inlet Z = 12"

Quantum™ 580

Medium Voltage WPII and WPI

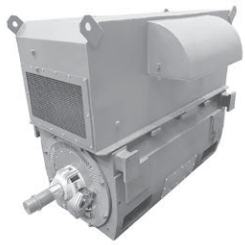
Standard Features



HP Range	800 - 2500
Poles	2, 4, 6
Voltage	2300/4000, 4160
Altitude	3300 ft
Ambient	40°C to -20°C
Balance/Vibration	NEMA Grade A
Bearing Insulation	Insulated bearing with grounding strap for Sleeve Bearings Insulated bearing brackets on both ends for Anti-Friction Bearings
Bearing Protection	Grease retainer on both ends (Anti-Friction Bearings) Labyrinth seals on both ends (Sleeve Bearings)
Bearing Temp Device	100 Ohm Platinum RTD both bearings
Bearing Type	Antifriction Bearings, 2-Pole 5812/5813 Sleeve Bearings
Bearing L10 Life	Direct Coupled 100,000 hrs
Conduit Box	Fabricated Steel; Gasketed and rotatable in 90 degree increments
Div 2 Temp Codes	Self Certified Class I Div 2 Groups A, B, C, D T3 200C AIT (unless otherwise noted on price page)
Efficiency	NEMA Premium (unless otherwise noted on price page)
Enclosure	WPII (IP 24) and WPI (IP 23)
End Shield	Gray Cast Iron Grade 30
Fasteners	SAE Grade 5, Zinc chromate plated
Frame Material	Gray Cast Iron Grade 30
Frame Size	5810, 5811, 5812, 5813
Frequency	60 Hz
Ground	Ground in main conduit box and 2 holes diagonally opposite on frame feet.
Insulation Class	Class F
Insulation System	Form coil epoxy VPI
Inverter Capabilities	Consult Factory
Leads	Permanently numbered, Non-wicking
Lifting Means	Four (4) cast in lifting lugs
Lubrication	Mobil PolyRex EM Grease; Self Cooled Lube Oil up to 40 deg C
Mounting	Foot Mounted F1
Mounting Holes	Dual drilled for 5810/5811, 5812/5813 mounting
Nameplate	304 Stainless Steel
NEMA Design	NEMA MG-1, Part 20 Standard Torques
Paint	Epoxyester Buff
Relubrication	Yes, both ends
Rotor	Copper bar
Service Factor	1.15 (unless otherwise noted on pricing pages)
Shaft Material	AISI 4142
Space Heater	120V Space heater, leads to accessory box
Stator Temp Device	100 platinum RTD's (total of 6, 2 per phase), leads to accessory box
Temperature Rise	90°C @ 1.0 SF (unless otherwise noted on pricing pages) by resistance
Tests	NEMA routine, IEEE 112
Time Rating	Continuous
Vertical Jack Screws	Provisions on Frame
Warranty	12 months from date of installation or 18 months from date of manufacture, whichever occurs first

Quantum™ 580

Medium Voltage WPII with Anti-friction Bearings



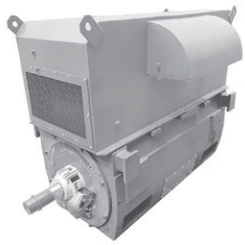
Volts: 2300/4000, 4160
HP: 800 - 2250

HP	RPM	Volts	Frame	Enclosure	Cat. No.	Model No.	Normally Stocked	Notes
800	1200	2300/4000	5811	WPII	**P58301**	5KS583EAM301	N	160
900	1800	2300/4000	5811	WPII	**P58201**	5KS583EAM201	N	
900	1200	2300/4000	5811	WPII	**P58302**	5KS583EAM302	N	160
1000	3600	2300/4000	5811	WPII	**P58101**	5KS583EAM103	N	66
1000	3600	2300/4000	5811	WPII	**P58102**	5KS583EAM109	N	62
1000	1800	2300/4000	5811	WPII	**P58203**	5KS583EAM202	N	
1000	1200	2300/4000	5811	WPII	**P58303**	5KS583EAM303	N	
1250	3600	2300/4000	5811	WPII	**P58105**	5KS583EAM104	N	66
1250	3600	2300/4000	5811	WPII	**P58106**	5KS583EAM110	N	62
1250	3600	4160	5811	WPII	**H5804**	5KS583EAM141	N	66, 159
1250	3600	4160	5811	WPII	**H5802**	5KS583EAM127	Y	62, 159
1250	1800	2300/4000	5811	WPII	**P58205**	5KS583EAM203	Y	
1250	1200	2300/4000	5813	WPII	**P58304**	5KS585EAM301	N	
1500	3600	2300/4000	5811	WPII	**P58109**	5KS583EAM105	N	66
1500	3600	2300/4000	5811	WPII	**P58110**	5KS583EAM111	N	62
1500	3600	4160	5811	WPII	**H5805**	5KS583EAM140	N	66, 149, 159
1500	3600	4160	5811	WPII	**H5803**	5KS583EAM126	Y	62, 149, 159
1500	1800	2300/4000	5811	WPII	**P58207**	5KS583EAM204	Y	160
1500	1200	2300/4000	5813	WPII	**P58305**	5KS585EAM302	N	
1750	1800	2300/4000	5813	WPII	**P58209**	5KS585EAM201	Y	
2000	1800	2300/4000	5813	WPII	**P58211**	5KS585EAM202	N	149
2250	1800	2300/4000	5813	WPII	**P58213**	5KS585EAM203	N	149, 160

Notes:
WPI enclosure available. Contact dealer for details.
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
149 Class F rise @ 1.0 SF only
159 Cast Aluminum Rotor
160 NEMA Standard Efficiency

Quantum™ 580

Medium Voltage WPII with Sleeve Bearings



Volts: 2300/4000
HP: 900 - 2500

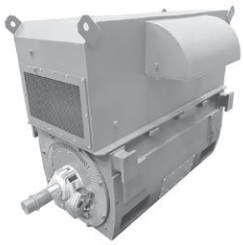
HP	RPM	Volts	Frame	Enclosure	Cat. No.	Model No.	Normally Stocked	Notes
900	1800	2300/4000	5811	WPII	**P58202**	5KS583EAM205	N	
1000	3600	2300/4000	5811	WPII	**P58103**	5KS583EAM106	N	66
1000	3600	2300/4000	5811	WPII	**P58104**	5KS583EAM112	N	62
1000	1800	2300/4000	5811	WPII	**P58204**	5KS583EAM206	N	
1250	3600	2300/4000	5811	WPII	**P58107**	5KS583EAM107	N	66
1250	3600	2300/4000	5811	WPII	**P58108**	5KS583EAM113	N	62
1250	1800	2300/4000	5811	WPII	**P58206**	5KS583EAM207	N	
1500	3600	2300/4000	5811	WPII	**P58111**	5KS583EAM108	N	66
1500	3600	2300/4000	5811	WPII	**P58112**	5KS583EAM114	N	62
1500	1800	2300/4000	5811	WPII	**P58208**	5KS583EAM208	N	160
1750	3600	2300/4000	5813	WPII	**P58113**	5KS585EAM102	N	66
1750	3600	2300/4000	5813	WPII	**P58114**	5KS585EAM106	N	62
1750	1800	2300/4000	5813	WPII	**P58210**	5KS585EAM204	N	
2000	3600	2300/4000	5813	WPII	**P58115**	5KS585EAM103	N	66
2000	3600	2300/4000	5813	WPII	**P58116**	5KS585EAM107	N	62
2000	1800	2300/4000	5813	WPII	**P58212**	5KS585EAM205	N	149
2250	3600	2300/4000	5813	WPII	**P58117**	5KS585EAM104	N	66, 149
2250	3600	2300/4000	5813	WPII	**P58118**	5KS585EAM108	N	62, 149
2250	1800	2300/4000	5813	WPII	**P58214**	5KS585EAM206	N	149, 160
2500	3600	2300/4000	5813	WPII	**P58119**	5KS585EAM105	N	66, 149
2500	3600	2300/4000	5813	WPII	**P58120**	5KS585EAM109	N	62, 149

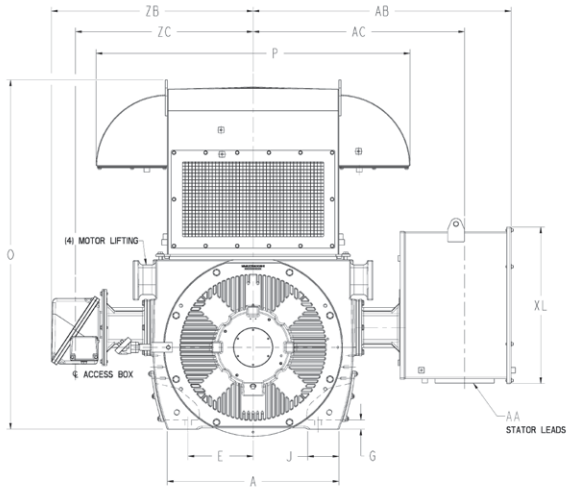
Notes:
WPI enclosure available. Contact dealer for details.
62 Only for CCW rotation facing opposite drive-end.
66 Only for CW rotation facing opposite drive-end.
149 Class F rise @ 1.0 SF only
160 NEMA Standard Efficiency

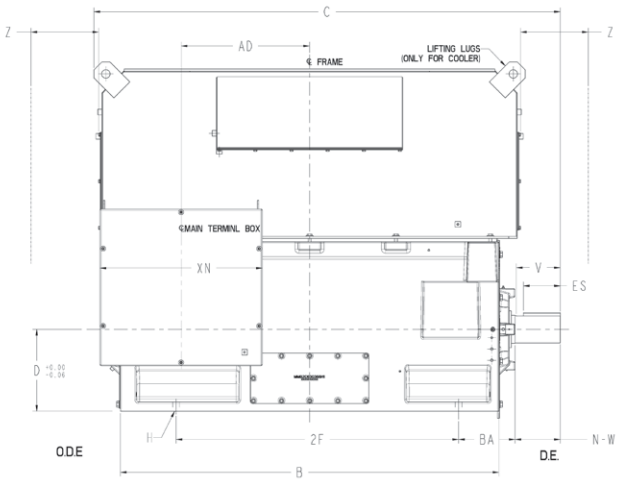
Quantum™ 580

Medium Voltage WPII with Anti-friction Bearings

Dimensions







Frame	Poles	Shaft						Mounting				A	B	C	D[3]	G	J	O	P	ZB	ZC
		Keyway		Key Length	N-W	U[1]	V[2]	E	H∅	BA	2F										
		Width	Depth																		
5810	2	1.00	0.575	5.50	7.75	3.875	7.50	11.50	1.18	10.00	36.00	30.4	54.00	70.0	14.50	1.64	5.52	62.0	55.6	35.3	31.1
	4-8	1.25	0.715	6.50	8.00	4.875	7.75	11.50	1.18	10.00	36.00	30.4	54.00	70.0	14.50	1.64	5.52	62.0	55.6	35.3	31.1
5811	2	1.00	0.575	5.50	7.75	3.875	7.50	11.50	1.18	10.00	40.00	30.4	54.00	70.0	14.50	1.64	5.52	62.0	55.6	35.3	31.1
	4-8	1.25	0.715	6.50	8.00	4.875	7.75	11.50	1.18	10.00	40.00	30.4	54.00	70.0	14.50	1.64	5.52	62.0	55.6	35.3	31.1
5812	4-8	1.25	0.715	6.50	8.00	4.875	7.75	11.50	1.18	10.00	45.00	30.4	67.00	82.6	14.50	1.64	5.52	62.0	55.6	35.3	31.1
5813	4-8	1.25	0.715	6.50	8.00	4.875	7.75	11.50	1.18	10.00	50.00	30.4	67.00	82.6	14.50	1.64	5.52	62.0	55.6	35.3	31.1

Conduit Box Dimensions

Frame	Voltage	AA	AB	AC	AD	XL	XN
5810/5811	<= 4.1 kV	4.00	44.81	37.44	16.24	27.72	28.74
5812/5813	<= 4.1 kV	4.00	44.81	37.44	22.74	27.72	28.74

Notes:

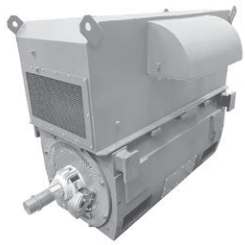
1 Tolerance on “U” dimension will be +0.000 inch -0.001 inch
2 Dimension “V” represents length of straight part of shaft extension
3 Tolerance on “D” dimension will be +0.000 inch -0.060 inch

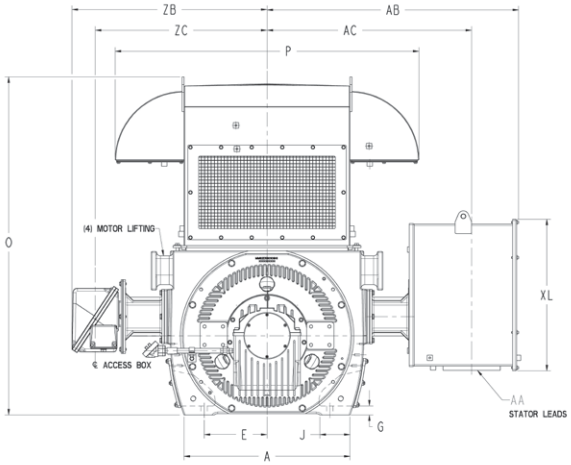
Minimum clearance required for air inlet Z = 12"

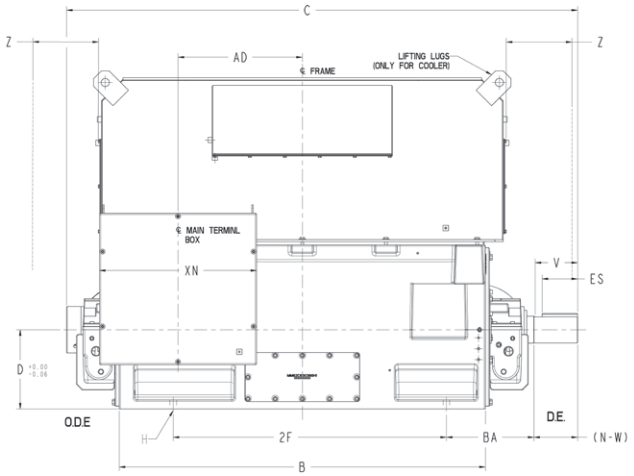
Quantum™ 580

Medium Voltage WPII with Sleeve Bearings

Dimensions







Frame	Poles	Shaft						Mounting				A	B	C	D[3]	G	J	O	P	ZB	ZC
		Keyway		Key Length	N-W	U[1]	V[2]	E	H∅	BA	2F										
		Width	Depth																		
5810	2	1.00	0.575	5.50	7.75	3.875	7.50	11.50	1.18	10.00	36.00	30.4	54.00	77.0	14.50	1.64	5.52	62.0	55.6	35.3	31.1
	4-8	1.25	0.715	6.50	8.00	4.875	7.75	11.50	1.18	16.00	36.00	30.4	54.00	80.5	14.50	1.64	5.52	62.0	55.6	35.3	31.1
5811	2	1.00	0.575	5.50	7.75	3.875	7.50	11.50	1.18	10.00	40.00	30.4	54.00	77.0	14.50	1.64	5.52	62.0	55.6	35.3	31.1
	4-8	1.25	0.715	6.50	8.00	4.875	7.75	11.50	1.18	16.00	40.00	30.4	54.00	80.5	14.50	1.64	5.52	62.0	55.6	35.3	31.1
5812	2	1.00	0.575	5.50	7.75	3.875	7.50	11.50	1.18	10.00	45.00	30.4	67.00	90.0	14.50	1.64	5.52	62.0	55.6	35.3	31.1
	4-8	1.25	0.715	6.50	8.00	4.875	7.75	11.50	1.18	16.00	45.00	30.4	67.00	93.5	14.50	1.64	5.52	62.0	55.6	35.3	31.1
5813	2	1.00	0.575	5.50	7.75	3.875	7.50	11.50	1.18	10.00	50.00	30.4	67.00	90.0	14.50	1.64	5.52	62.0	55.6	35.3	31.1
	4-8	1.25	0.715	6.50	8.00	4.875	7.75	11.50	1.18	16.00	50.00	30.4	67.00	93.5	14.50	1.64	5.52	62.0	55.6	35.3	31.1

Conduit Box Dimensions

Frame	Voltage	AA	AB	AC	AD	XL	XN
5810/5811	<= 4.1 kV	4.00	44.81	37.44	16.24	27.72	28.74
5812/5813	<= 4.1 kV	4.00	44.81	37.44	22.74	27.72	28.74

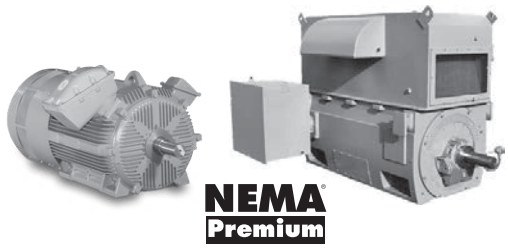
Notes:

1 Tolerance on “U” dimension will be +0.000 inch -0.001 inch
2 Dimension “V” represents length of straight part of shaft extension
3 Tolerance on “D” dimension will be +0.000 inch -0.060 inch

Minimum clearance required for air inlet Z = 12"

Keyless Shaft Motors for use on Reciprocating Compressors

Standard Features



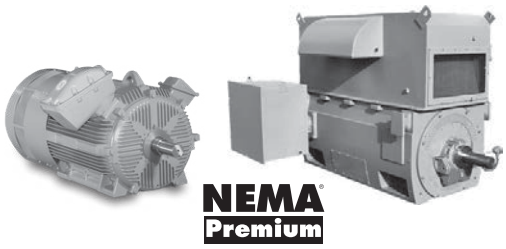
Enclosure	TEFC	WPII
HP Range	150 - 500	600 - 6000
Poles	4, 6	4, 6, 8
Voltage	460	460, 2300/4000, 4000, 4160
Altitude	3300 ft	3300 ft
Ambient	50°C	50°C
Balance/Vibration	0.040 in/sec (445 - 449 Frame) / NEMA Grade B (500 Frame)	NEMA Grade A
Bearing Insulation	Insulated bearings on ODE	Insulated bearing with grounding strap for Sleeve Bearings / Insulated bearing brackets on both ends for Anti-friction Bearings
Bearing Protection	IP55; Shaft Slinger both ends (unless otherwise noted on price page)	Grease retainer on both ends (Anti-friction Bearings); Labyrinth Seals on both ends (Sleeve Bearings)
Bearing Temp Device	Provisions on DE and ODE plugged on 449 Frame and below; 100 ohm Platinum RTD both bearings on 500 Frame	100 ohm Platinum RTD both bearings
Bearing Type	Anti-friction Bearings Single Shielded	Anti-friction Bearings Single Shielded; Sleeve Bearings
Conduit Box	Casting / Fabricated Steel; Gasketed and rotatable in 90 degrees increments - F1 Mounted	Fabricated Steel; Gasketed and rotatable in 90 degrees increments - F1 Mounted
Div 2 Temp Codes	Self Declared Class I, Div 2 Groups A, B, C, D T3 200C AIT (unless otherwise noted on price page)	Self Declared Class I, Div 2 Groups A, B, C, D T3 200C AIT (unless otherwise noted on price page)
Efficiency	NEMA Premium (unless otherwise noted on price page)	NEMA Premium (unless otherwise noted on price page)
End Shield	Cast Iron	Cast Iron (5000 and 5800 Frame); Fabricated Steel (560 - 630 and 6800 - 9600 Frame)
Fasteners	SAE Grade 5, Zinc Chromate Plated	SAE Grade 5, Zinc Chromate Plated
Frame Material	Cast Iron	Cast Iron (5000 and 5800 Frame); Fabricated Steel (560 - 630 and 6800 - 9600 Frame)
Frame Size	445 - 5011	560 - 630, 5000, 5800, 6800, 8000, 9600, 12000†
Frequency	60 Hz	60 Hz
Ground	Ground in main conduit box and NEMA ground pad(s) on Frame	Ground in main conduit box and 2 NEMA type ground pads on Frame
Insulation Class	Class H (449 and below) / F (500 Frame)	Class F
Insulation System	Polyester Resin, Trickle Treated (449 and below) / Epoxy VPI (500 Frame)	Formed Coil Epoxy VPI (unless otherwise noted on pricing pages)
Inverter Capabilities	Suitable for VFD Operation, 2:1 CT. Consult factory for other requirements	Suitable for VFD Operation, 2:1 CT. Consult factory for other requirements
Leads	Permanently numbered, Non-wicking	Permanently numbered, Non-wicking
Lifting Means	Four (4) cast-in lifting lugs on Frame on 449 and below / Two (2) cast-in lifting lugs on 500 Frame	Four (4) cast-in lifting lugs on Frame
Lubrication	Polyurea Grease	Polyurea Grease; Self Cooled Lube Oil
Mounting	Foot Mounted F1	Foot Mounted F1
Mounting Holes	Dual drilled	Dual drilled for 5800 Frame; Single drilled for 560 - 630, 5000, and 6800 - 9600 Frame
Nameplate	Stainless Steel	Stainless Steel
NEMA Design	NEMA MG-1, Part 20 Standard Torques for Reciprocating Compressors	NEMA MG-1, Part 20 Standard Torques for Reciprocating Compressors
Paint	Epoxyester Buff	Epoxyester Buff
Relubrication	Yes, both ends	Yes, both ends
Rotor	Aluminum Die Cast	Copper Bar (unless noted)
Service Factor	1.15 (unless otherwise noted on pricing pages)	1.15 (unless otherwise noted on pricing pages)
Shaft Material	AISI 4142 Keyless	AISI 4140 / 4142 Keyless
Space Heater	115 V thermostatically controlled, leads to: accessory box on 500 frame / main conduit box 449 Frame and below	115 V Space Heater, leads to accesssory box
Stator Temp Device	100 ohm winding RTDs on 500 Frame only, leads to accessory box	100 ohm winding RTDs, leads to accessory box
Temperature Rise	Class B @ 1.0 SF (unless otherwise noted on pricing pages)	Class B @ 1.0 SF (unless otherwise noted on pricing pages)
Tests	NEMA Routine, IEEE 112 Method B	NEMA Routine, IEEE 112 Method B / F
Time Rating	Continuous	Continuous
Vertical Jack Screws	Included on 500 Frame Motors	Included
Warranty	36 months from date of installation or 42 months from date of manufacture, whichever occurs first	12 months from date of installation or 18 months from date of manufacture, whichever occurs first

Notes:

† All 560+ and 6800+ frame motors are Wolong branded.

Keyless Shaft Motors for use on Reciprocating Compressors

TEFC and WPII with Anti-friction Bearings



- 100 ohm winding RTDs to accessory conduit box (supplied on 500 Frame and above only)
- 115 V space heater
- 100 ohm bearing RTDs (supplied on 500 Frame and above only, provisions on 449 Frame and below)
- Provision for vibration sensor mounting, 1/4"-18 NPT hole on both sides
- Stainless steel air filters (WPII only)
- Air pressure differential switch (WPII only)
- Transition bases available to match 5800 (14.5") frame shaft height from 500 Frame (12.5"), consult factory (WPII only)

Volts: 460, 2300/4000, 4000, 4160
HP: 150 - 2500

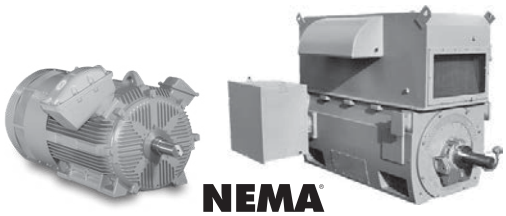
HP	RPM	Volts	Frame	Enclosure	Motor Rotation	Cat. No.	Model No.	Normally Stocked	Notes
150	1800	460	445TZ	TEFC	Both	**R44201**	5KAF445SAA258	N	164
150	1200	460	445TZ	TEFC	Both	**R44301**	5KAF445SAA335	N	164
150	1200	460	447TZ	TEFC	Both	**R44302**	5KAF447SAA328	N	164
200	1800	460	445TZ	TEFC	Both	**R44202**	5KAF445SAA259	Y	164
200	1800	460	447TZ	TEFC	Both	**R44203**	5KAF447SAA240	N	164
200	1200	460	449TZ	TEFC	Both	**R44303**	5KAF449SAA340	N	165
250	1800	460	449TZ	TEFC	Both	**R44204**	5KAF449SAA255	N	165
250	1200	460	449TZ	TEFC	Both	**R44304**	5KAF449SAA341	N	165
300	1800	460	449TZ	TEFC	Both	**R44205**	5KAF449SAA256	N	165
300	1200	460	509Z	TEFC	Both	**R50301**	5KAF509SAA334	N	169
350	1800	460	449TZ (HO)	TEFC	Both	**R44206**	5KAF449SAH220	N	165, 175
350	1200	460	5011Z	TEFC	Both	**R50302**	5KAF511SAA329	N	169
400	1800	460	509Z	TEFC	Both	**R50201**	5KAF509SAA237	N	169
400	1200	460	5011Z	TEFC	Both	**R50303**	5KAF511SAA330	N	169
450	1800	460	5011Z	TEFC	Both	**R50202**	5KAF511SAA235	N	169
450	1800	460	5011Z	TEFC	Both	**R50213**	5KS511SAA2126	Y	171
450	1200	460	5011Z	TEFC	Both	**R50304**	5KAF511SAA331	N	171
500	1800	460	5011Z	TEFC	Both	**R50203**	5KAF511SAA236	N	169
500	1200	460	5013Z	TEFC	Both	**R50305**	5KAF513SAA337	N	169
600	1800	460	5011Z	WPII	Both	**R50204**	5KAF511EAG220	N	159, 169
600	1800	460	5011Z	WPII	Both	**R50214**	5KS511EAG245	N	159, 171
600	1800	460	5011Z	WPII	Both	**R50207**	5KAF511EAG222	N	159, 169, 176
600	1800	460	5011Z	WPII	Both	**R50216**	5KS511EAG255	N	159, 171, 201

Notes:

149 Class F rise @ 1.0 SF only
159 Cast Aluminum Rotor
160 NEMA Standard Efficiency
161 Filters not included
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
169 5700 cubic inch conduit box
171 11500 cubic inch conduit box
175 Special long "high output frame". Contact dealer for outline drawing. This frame is not suitable for F1 to F2 conversion.
176 Formed Coil Epoxy VPI
189 Does not include bearing RTDs or space heater. Contact your dealer if these are required.
201 1.25SF, low temp rise ducted rotor, insulated bearings both ends, copper bar standoffs, abrasion winding treatment

Keyless Shaft Motors for use on Reciprocating Compressors

TEFC and WPII with Anti-friction Bearings



Volts: 460, 2300/4000, 4000, 4160
HP: 150 - 2500

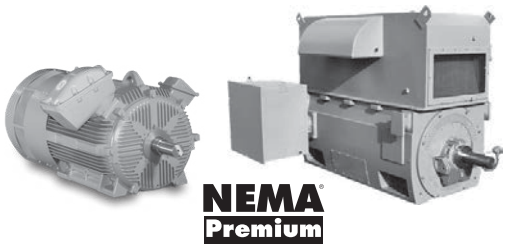
HP	RPM	Volts	Frame	Enclosure	Motor Rotation	Cat. No.	Model No.	Normally Stocked	Notes
600	1800	2300/4000	5011Z	WPII	Both	**R50210**	5KAF511EAG224	N	159, 169, 176
600	1200	460	5011Z	WPII	Both	**R50306**	5KAF511EAG320	N	159, 169
600	1200	460	5011Z	WPII	Both	**R50308**	5KAF511EAG321	N	159, 169, 176
600	1200	460	5013Z	WPII	Both	**R50309**	5KAF513EAG325	N	159, 171, 176
600	1200	2300/4000	5013Z	WPII	Both	**R50311**	5KAF513EAG323	N	159, 169, 176
700	1800	460	5011Z	WPII	Both	**R50205**	5KAF511EAG221	N	159, 169
700	1800	460	5011Z	WPII	Both	**R50208**	5KAF511EAG223	N	159, 169, 176
700	1800	2300/4000	5011Z	WPII	Both	**R50211**	5KAF511EAG225	N	159, 169, 176
700	1200	460	5013Z	WPII	Both	**R50307**	5KAF513EAG321	N	159, 169
700	1200	460	5013Z	WPII	Both	**R50310**	5KAF513EAG322	N	159, 169, 176
700	1200	2300/4000	5013Z	WPII	Both	**R50312**	5KAF513EAG324	N	159, 169, 176
800	1800	460	5013Z	WPII	Both	**R50206**	5KAF513EAG220	N	159, 169
800	1800	460	5013Z	WPII	Both	**R50215**	5KS513EAG237	N	159, 171
800	1800	460	5013Z	WPII	Both	**R50209**	5KAF513EAG221	N	159, 169, 176
800	1800	2300/4000	5013Z	WPII	Both	**R50212**	5KAF513EAG222	N	159, 169, 176
800	1800	460	5811Z	WPII	Both	**R58202**	5KS583EAM225	Y	159, 169, 176
800	1200	460	5811Z	WPII	Both	**R58312**	5KS583EAM324	N	149, 169, 176
800	1200	4000	5811Z	WPII	Both	**R58313**	5KS583EAM323	N	149, 169, 176
800	900	4000	5812Z	WPII	Both	**R58401**	5KS584EAM422	N	149, 169, 176
900	1200	4000	5810Z	WPII	Both	**R58306**	5KS582EAM322	N	149, 169, 176
900	900	4000	5812Z	WPII	Both	**R58403**	5KS584EAM423	N	149, 169, 176
1000	1200	4000	5812Z	WPII	Both	**R58309**	5KS584EAM320	N	149, 169, 176
1000	900	4000	5812Z	WPII	Both	**R58405**	5KS584EAM424	N	149, 169, 176

Notes:

149 Class F rise @ 1.0 SF only
159 Cast Aluminum Rotor
160 NEMA Standard Efficiency
161 Filters not included
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
169 5700 cubic inch conduit box
171 11500 cubic inch conduit box
175 Special long “high output frame”. Contact dealer for outline drawing. This frame is not suitable for F1 to F2 conversion.
176 Formed Coil Epoxy VPI
189 Does not include bearing RTDs or space heater. Contact your dealer if these are required.

Keyless Shaft Motors for use on Reciprocating Compressors

TEFC and WPII with Anti-friction Bearings



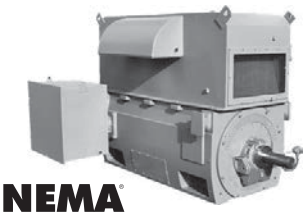
Volts: 460, 2300/4000, 4000, 4160
HP: 150 - 2500

HP	RPM	Volts	Frame	Enclosure	Motor Rotation	Cat. No.	Model No.	Normally Stocked	Notes
1250	1200	4000	5812Z	WPII	Both	**R58311**	5KS584EAM326	N	149, 161, 169, 176
1250	1200	4160	5812Z	WPII	Both	**R58314**	5KS584EAM327	Y	149, 169, 176
1250	900	4000	6813Z	WPII	CW	**R68401**	5KS685EAM401	N	160, 169, 176
1250	900	4000	6813Z	WPII	CCW	**R68402**	5KS685EAM402	N	160, 169, 176
1500	1200	4000	6811Z	WPII	Both	**R68303**	5KS683EAM303	N	160, 169, 176
1500	900	4000	6813Z	WPII	CW	**R68405**	5KS685EAM405	N	160, 169, 176
1500	900	4000	6813Z	WPII	CCW	**R68406**	5KS685EAM406	N	160, 169, 176
1750	1200	4000	6813Z	WPII	CW	**R68307**	5KS685EAM301	N	160, 169, 176
1750	1200	4000	6813Z	WPII	CCW	**R68308**	5KS685EAM302	N	160, 169, 176
1750	900	4000	8011Z	WPII	CW	**R80401**	5KS803EAM401	N	160, 169, 176
1750	900	4000	8011Z	WPII	CCW	**R80402**	5KS803EAM402	N	160, 169, 176
2000	1200	4000	6813Z	WPII	CW	**R68311**	5KS685EAM307	N	160, 169, 176
2000	1200	4000	6813Z	WPII	CCW	**R68312**	5KS685EAM308	N	160, 169, 176
2000	900	4000	8011Z	WPII	CW	**R80405**	5KS803EAM405	N	160, 169, 176
2000	900	4000	8011Z	WPII	CCW	**R80406**	5KS803EAM406	N	160, 169, 176
2500	1200	4000	6813Z	WPII	CW	**R68315**	5KS685EAM311	N	160, 169, 176
2500	1200	4000	6813Z	WPII	CCW	**R68316**	5KS685EAM312	N	160, 169, 176

Notes:
All 6800+ frame motors are Wolong branded.
149 Class F rise @ 1.0 SF only
159 Cast Aluminum Rotor
160 NEMA Standard Efficiency
161 Filters not included
164 1260 cubic inch conduit box
165 2500 cubic inch conduit box 2-4" NPT
169 5700 cubic inch conduit box
175 Special long “high output frame”. Contact dealer for outline drawing. This frame is not suitable for F1 to F2 conversion.
176 Formed Coil Epoxy VPI

Keyless Shaft Motors for use on Reciprocating Compressors

WPII with Sleeve Bearings



NEMA Premium

- 100 ohm winding RTDs to accessory conduit box
- 115 V space heater
- 100 ohm bearing RTDs
- Provision for vibration sensor mounting, 1/4"-18 NPT hole on both sides
- Stainless steel air filters
- Air pressure differential switch

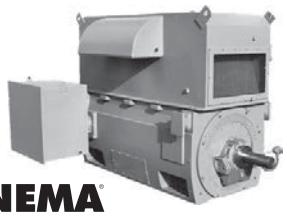
Volts: 4000, 4160
HP: 800 - 6000

HP	RPM	Volts	Frame	Enclosure	Motor Rotation	Cat. No.	Model No.	Normally Stocked	Notes
800	1800	4160	5810Z	WPII	Both	**R58201**	5KS582EAM223	Y	176
800	1200	4000	5810Z	WPII	Both	**R58307**	5KS582EAM323	N	149, 169, 176
800	900	4000	5812Z	WPII	Both	**R58402**	5KS584EAM425	N	149, 169, 176
900	1200	4000	5810Z	WPII	Both	**R58308**	5KS582EAM324	N	149, 169, 176
900	900	4000	5812Z	WPII	Both	**R58404**	5KS584EAM426	N	149, 169, 176
1000	1200	4000	5812Z	WPII	Both	**R58310**	5KS584EAM323	N	149, 169, 176
1000	900	4000	5812Z	WPII	Both	**R58406**	5KS584EAM427	N	149, 169, 176
1250	1200	4000	6811Z	WPII	Both	**R68301**	5KS683EAM301	N	160, 169, 176
1250	900	4000	6813Z	WPII	CW	**R68403**	5KS685EAM403	N	160, 169, 176
1250	900	4000	6813Z	WPII	CCW	**R68404**	5KS685EAM404	N	160, 169, 176
1500	1200	4000	6811Z	WPII	Both	**R68305**	5KS683EAM305	N	160, 169, 176
1500	1200	4160	6811Z	WPII	Both	**R68319**	5KS683EAM319	Y	160, 169, 176
1500	900	4000	6813Z	WPII	CW	**R68407**	5KS685EAM407	N	160, 169, 176
1500	900	4000	6813Z	WPII	CCW	**R68408**	5KS685EAM408	N	160, 169, 176
1750	1200	4000	6813Z	WPII	CW	**R68309**	5KS685EAM303	N	160, 169, 176
1750	1200	4000	6813Z	WPII	CCW	**R68310**	5KS685EAM304	N	160, 169, 176
1750	900	4000	8011Z	WPII	CW	**R80403**	5KS803EAM403	N	160, 169, 176
1750	900	4000	8011Z	WPII	CCW	**R80404**	5KS803EAM404	N	160, 169, 176
2000	1200	4000	6813Z	WPII	CW	**R68313**	5KS685EAM309	N	160, 169, 176
2000	1200	4000	6813Z	WPII	CCW	**R68314**	5KS685EAM310	N	160, 169, 176
2000	1200	4160	6813Z	WPII	CW	**R68320**	5KS685EAM306	Y	160, 169, 176
2000	900	4000	8011Z	WPII	CW	**R80407**	5KS803EAM407	N	160, 169, 176
2000	900	4000	8011Z	WPII	CCW	**R80408**	5KS803EAM408	N	160, 169, 176
2500	1200	4000	6813Z	WPII	CW	**R68317**	5KS685EAM313	N	160, 169, 176
2500	1200	4000	6813Z	WPII	CCW	**R68318**	5KS685EAM314	N	160, 169, 176
2500	900	4000	9611Z	WPII	CW	**R96401**	5KS963EAM401	N	160, 169, 176
2500	900	4000	9611Z	WPII	CCW	**R96402**	5KS963EAM402	N	160, 169, 176
3000	1200	4000	8010Z	WPII	CW	**R80301**	5KS802EAM301	N	160, 169, 176
3000	1200	4000	8010Z	WPII	CCW	**R80302**	5KS802EAM302	N	160, 169, 176
3000	900	4000	9611Z	WPII	CW	**R96403**	5KS963EAM403	N	160, 169, 176
3000	900	4000	9611Z	WPII	CCW	**R96404**	5KS963EAM404	N	160, 169, 176

Notes:
All 560+ and 6800+ frame motors are Wolong branded.
149 Class F rise @ 1.0 SF only
160 NEMA Standard Efficiency
169 5700 cubic inch conduit box
176 Formed Coil Epoxy VPI

Keyless Shaft Motors for use on Reciprocating Compressors

WPII with Sleeve Bearings



NEMA Premium

Volts: 4000, 4160
HP: 800 - 6000

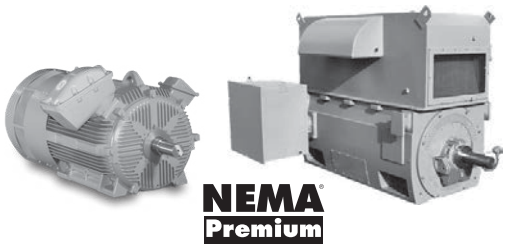
HP	RPM	Volts	Frame	Enclosure	Motor Rotation	Cat. No.	Model No.	Normally Stocked	Notes
3500	1200	4000	8012Z	WPII	CW	**R80303**	5KS804EAM301	N	160, 169, 176
3500	1200	4000	8012Z	WPII	CCW	**R80304**	5KS804EAM302	N	160, 169, 176
3500	900	4000	9612Z	WPII	CW	**R96405**	5KS964EAM405	N	160, 169, 176
3500	900	4000	9612Z	WPII	CCW	**R96406**	5KS964EAM406	N	160, 169, 176
4000	1200	4160	Y564Z	WPII	Both	**R56301**	5KS564EWL321	N	160, 176
4000	900	4160	Y566Z	WPII	Both	**R56401**	5KS566EWL423	N	160, 176
4500	1200	4160	Y564Z	WPII	Both	**R56302**	5KS564EWL322	N	160, 176
4500	900	4160	Y566Z	WPII	Both	**R56402**	5KS566EWL424	N	160, 176
5000	1200	4160	Y566Z	WPII	Both	**R63301**	5KS566EWL323	N	160, 176
5000	900	4160	Y634Z	WPII	Both	**R63401**	5KS634EWL421	N	160, 176
5500	1200	4160	Y566Z	WPII	Both	**R56303**	5KS566EWL324	N	160, 176
5500	900	4160	Y634Z	WPII	Both	**R63402**	5KS634EWL422	N	160, 176
6000	1200	4160	Y634Z	WPII	Both	**R63302**	5KS634EWL321	N	160, 176
6000	900	4160	Y634Z	WPII	Both	**R63403**	5KS634EWL423	N	160, 176

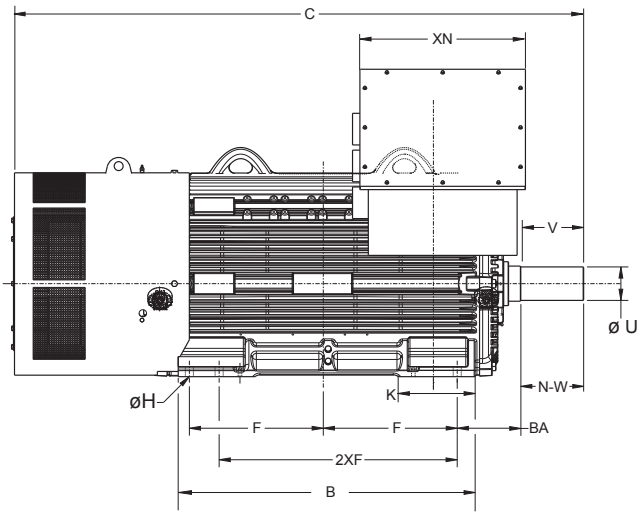
Notes:
All 560+ and 6800+ frame motors are Wolong branded.
149 Class F rise @ 1.0 SF only
160 NEMA Standard Efficiency
169 5700 cubic inch conduit box
176 Formed Coil Epoxy VPI

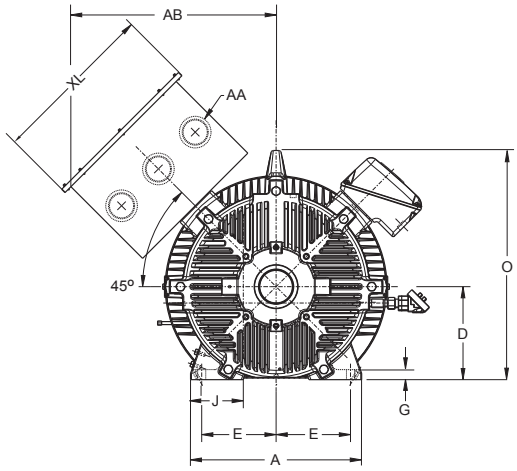
Keyless Shaft Motors for use on Reciprocating Compressors

TEFC with Anti-friction Bearings

Dimensions







TEFC

Frame	Poles	Dimensions in Inches															
		Keyless Shaft			Mounting												
		N-W	U[1]	V[2]	BA	D[3]	E	2F	2XF	H	A	B	C	G	J	K	O
445TZ	4	8.50	3.375	8.25	7.50	11.00	9.00	16.50	14.50	0.81	20.00	18.80	45.62	1.49	2.64	4.96	23.94
447TZ	4	8.50	3.375	8.25	7.50	11.00	9.00	25.00	20.00	0.81	20.00	27.31	54.12	1.49	2.64	8.81	23.94
449TZ	4	8.50	3.375	8.25	7.50	11.00	9.00	25.00	20.00	0.81	20.00	27.31	54.12	1.49	2.64	8.81	23.94
449TZ (HO)	4	8.50	3.375	8.25	7.50	11.00	9.00	25.00	–	0.81	20.24	27.31	59.37	1.49	2.70	5.26	24.04
509Z	4	8.50	4.500	8.00	8.50	12.50	10.00	28.00	25.00	1.07	23.00	31.90	68.88	1.35	7.09	8.36	30.80
5011Z	4	8.50	4.500	8.00	8.50	12.50	10.00	36.00	32.00	1.07	23.00	39.90	76.88	1.35	7.09	10.00	30.80

Conduit Box Dimensions

Frame	Volume cu-in	Dimensions in Inches			
		AA	AB	XL	XN
445TZ	1260	(2) 4" - 8 NPT	22.60	12.35	16.25
447TZ	1260	(2) 4" - 8 NPT	22.60	12.35	16.25
449TZ	2500	(2) 4" - 8 NPT	23.26	13.73	27.24
509Z	5700	(3) 3" - 8 NPT	28.83	22.25	22.25
5011Z	5700	(3) 3" - 8 NPT	28.83	22.25	22.25
	11500	(3) 4" - 8 NPT	34.57	25.00	41.00

Notes:

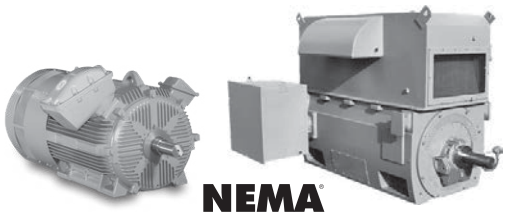
1 Tolerance on “U” dimension will be +0.000 inch, -0.001 inch
2 Dimension “V” represents length of straight part of shaft extension
3 Tolerance on “D” dimension will be +0.000 inch, -0.060 inch

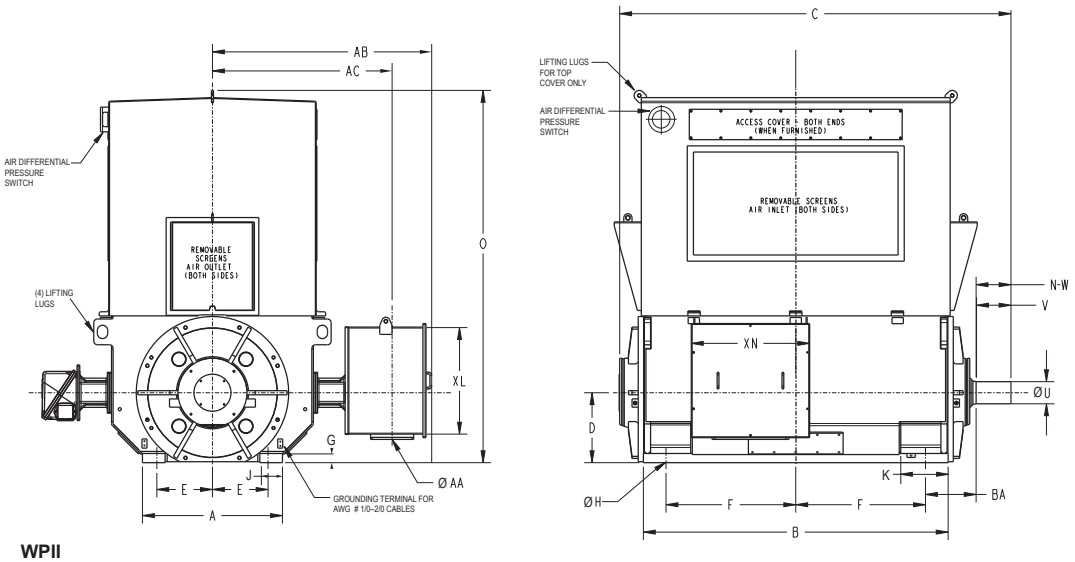
Motors are depicted with representative conduit box. For specific dimensions or a complete motor outline drawing, contact your Emporium Energy representative.

Keyless Shaft Motors for use on Reciprocating Compressors

WPII with Anti-friction Bearings

Dimensions





WPII

Frame	Poles	Dimensions in Inches														
		Keyless Shaft			Mounting											
		N-W	U[1]	V[2]	BA	D[3]	E	F	H	A	B	C	G	J	K	O
5011Z[41]	4	10.00	4.50	9.50	8.50	12.50	10.00	18.00	1.06	26.00	40.60	62.65	1.10	5.00	6.50	45.26
5013Z[42]	4	10.00	4.50	9.50	8.50	12.50	10.00	22.50	1.06	26.00	49.60	71.65	1.70	5.00	6.50	45.26
5808Z[43]	4	10.00	5.75	9.50	10.00	14.50	11.50	14.00	1.13	29.55	40.60	72.19	3.70	6.78	–	47.26
5810Z[43]	4	10.00	5.75	9.50	10.00	14.50	11.50	18.00	1.13	29.55	49.60	79.93	3.70	6.78	–	47.26
5013Z[42]	6	10.00	4.70	9.50	8.50	12.50	10.00	22.50	1.06	26.00	49.60	71.65	1.70	5.00	–	45.26
5810Z	6	8.00	5.00	7.75	10.00	14.50	11.50	18.00	1.18	30.40	54.00	70.00	1.64	5.52	–	62.00
5812Z	6	8.00	5.00	7.75	10.00	14.50	11.50	22.50	1.18	30.40	67.00	82.60	1.64	5.52	–	62.00
	8	8.00	5.00	7.75	10.00	14.50	11.50	22.50	1.18	30.40	67.00	82.60	1.64	5.52	–	62.00
6811Z	6	8.75	6.00	8.50	11.50	17.00	13.50	25.00	1.18	34.00	61.00	82.70	2.25	5.50	–	90.69
6813Z	6	8.75	6.00	8.50	14.00	17.00	13.50	31.50	1.18	34.00	74.00	95.50	2.25	5.50	–	90.69
	8	8.75	6.00	8.50	14.00	17.00	13.50	31.50	1.18	34.00	74.00	95.50	2.25	5.50	–	90.69
	6	8.75	7.50	8.50	14.00	17.00	13.50	31.50	1.18	34.00	74.00	95.50	2.25	5.50	–	90.69
8011Z	8	10.75	7.50	10.50	14.00	20.00	17.00	28.00	1.44	40.00	68.00	96.10	1.25	5.00	–	82.19

Conduit Box Dimensions

Frame	Volume cu-in	Dimensions in Inches				
		AA	AB	AC	XL	XN
5000Z	5700	(3) 3" - 8 NPT	35.60	28.50	22.25	22.25
	11500	(4) 4" - 8 NPT	37.70	29.10	20.00	36.00
5800Z	5700	4" - 8 NPT	44.81	37.44	27.72	28.74
6800Z	5700	4" - 8 NPT	52.50	43.75	27.72	28.74
8000Z	5700	4" - 8 NPT	56.50	47.75	27.72	28.74

Notes:

All 6800+ frame motors are Wolong branded.

1 Tolerance on "U" dimension will be +0.000 inch, -0.001 inch

2 Dimension "V" represents length of straight part of shaft extension

3 Tolerance on "D" dimension will be +0.000 inch, -0.060 inch

41 5011Z motor with transition base to match 5808Z

42 5013Z motor with transition base to match 5810Z

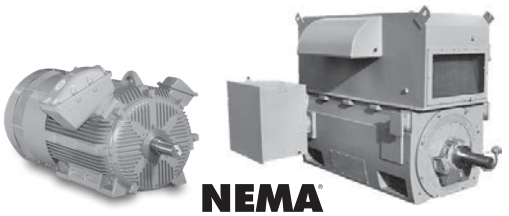
43 5808Z and 5810Z 4-pole, dimensions considering 500 frame motor mounted on a transition base

Motors are depicted with representative conduit box. For specific dimensions or a complete motor outline drawing, contact your Emporium Energy representative.

Keyless Shaft Motors for use on Reciprocating Compressors

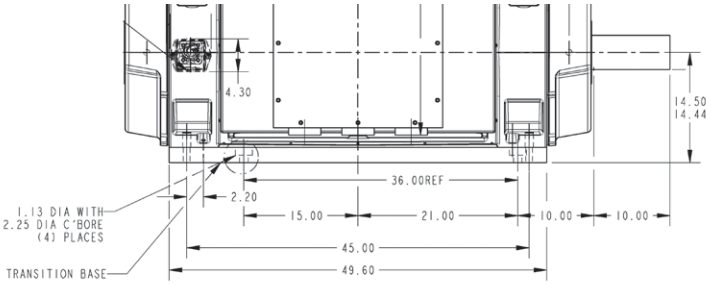
WPII with Anti-friction Bearings

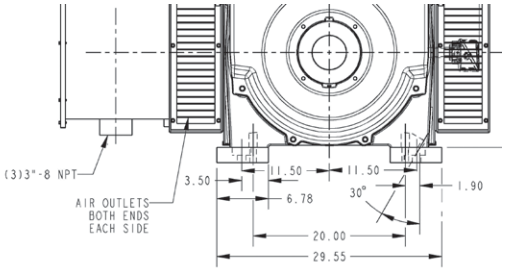
Dimensions (cont.)



Transition Base

Intermidate base can be supplied if requested to match 5800 shaft height from a 5000 frame motor.

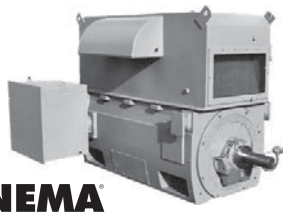




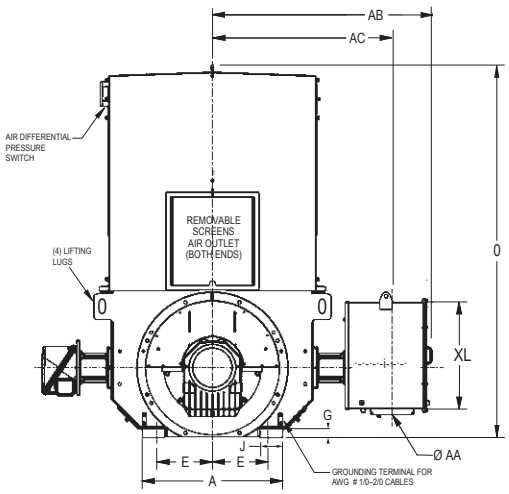
Keyless Shaft Motors for use on Reciprocating Compressors

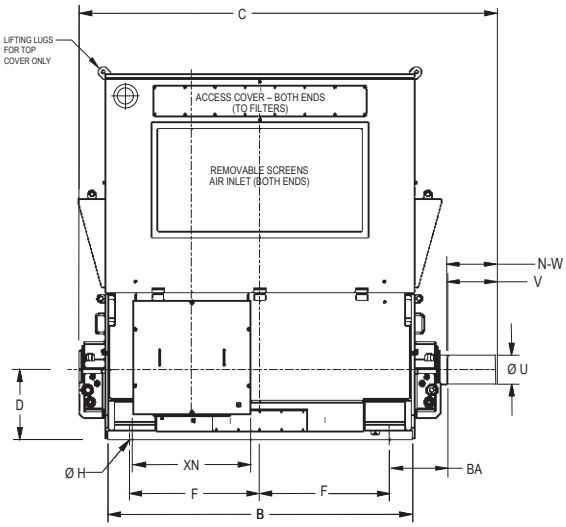
WPII with Sleeve Bearings

Dimensions



NEMA Premium





WPII

Frame	Poles	Dimensions in Inches													
		Keyless Shaft			Mounting										
		N-W	U[1]	V[2]	BA	D[3]	E	F	H	A	B	C	G	J	O
5810Z	6	8.00	5.0	7.75	10.00	14.50	11.50	18.00	1.18	30.40	54.00	80.50	1.64	5.52	62.00
5812Z	6	8.00	5.0	7.75	16.00	14.50	11.50	22.50	1.18	30.40	67.00	93.50	1.64	5.52	62.00
	8	8.00	5.0	7.75	16.00	14.50	11.50	22.50	1.18	30.40	67.00	93.50	1.64	5.52	62.00
6811Z	6	8.75	6.0	8.50	11.50	17.00	13.50	25.00	1.18	34.00	61.00	82.70	2.25	5.50	90.69
6813Z	6	9.75	6.0	9.50	14.00	17.00	13.50	31.50	1.18	34.00	74.00	96.50	2.25	5.50	90.69
	8	9.75	6.0	9.50	14.00	17.00	13.50	31.50	1.18	34.00	74.00	96.50	2.25	5.50	90.69
	6	9.75	6.5	9.50	14.00	17.00	13.50	31.50	1.18	34.00	74.00	96.50	2.25	5.50	90.69
8010Z	6	12.25	7.5	12.00	14.00	20.00	17.00	28.00	1.44	40.00	68.00	96.10	1.25	5.00	82.19
8011Z	8	12.25	6.5	12.00	14.00	20.00	17.00	32.00	1.44	40.00	68.00	96.10	1.25	5.00	82.19
8012Z	6	12.25	7.5	12.00	14.00	20.00	17.00	35.50	1.44	40.00	75.00	103.10	1.25	5.00	82.19
9611Z	8	12.75	7.5	12.50	16.00	24.00	21.50	31.50	1.56	48.00	77.00	107.20	1.25	5.00	98.59
9612Z	8	12.75	7.5	12.50	16.00	24.00	21.50	35.50	1.56	48.00	85.00	115.20	1.25	5.00	98.59

Conduit Box Dimensions

Frame	Volume cu-in	Dimensions in Inches				
		AA	AB	AC	XL	XN
5800Z	5700	4" - 8 NPT	44.81	37.44	27.72	28.74
6800Z	5700	4" - 8 NPT	52.50	43.75	27.72	28.74
8000Z	5700	4" - 8 NPT	56.50	47.75	27.72	28.74
9600Z	5700	4" - 8 NPT	65.50	52.75	27.72	28.74

Notes:

All 6800+ frame motors are Wolong branded.

1 Tolerance on “U” dimension will be +0.000 inch, -0.001 inch

2 Dimension “V” represents length of straight part of shaft extension

3 Tolerance on “D” dimension will be +0.000 inch, -0.060 inch

Motors are depicted with representative conduit box. For specific dimensions or a complete motor outline drawing, contact your Emporium Energy representative.

Notes

DC
Direct Current Motors

DC.3 **Kinamatic II™ Standard Features**

DC.4 **Shunt Wound - Self Ventilated**

DC.5 **Shunt Wound - Separately Ventilated**

DC.6 **Shunt Wound - Blower Ventilated**

DC.7 **Shunt Wound - Totally Enclosed**

DC.8 **Type-K Power Supply**

DC.9 **DC Dimensions**

DC.20 **DC Motor Kits and Accessories**

DC.22 **Mill Duty Motors**

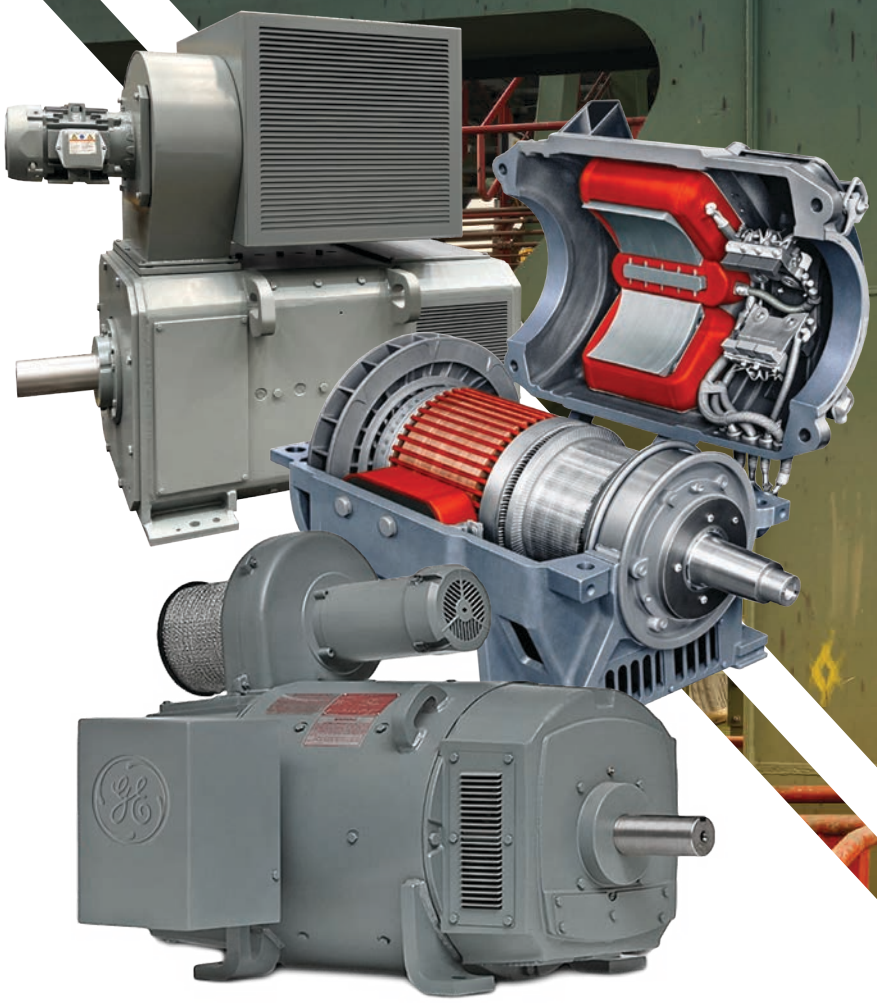
DC.22 Standard Features and Product Offering

DC.23 Dimensions



WOLONG

Power your future



DC Motors

DC motors are widely used in mining, metals, and aggregate production and material handling with a large installed base.

Kinamatic II

1 - 500 HP
1150, 1750 RPM
Armature 240, 500 V
Field 300/150, 240/120 V

Mill Duty

800 and 600Z Series
7.5 - 625 HP
Various Speeds
300 - 2000 RPM
230 V

5 Year Warranty

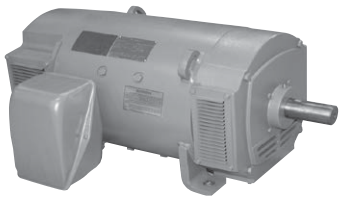
Wolong is offering a 5 year manufacturer's warranty on these GE direct current motor models:
Mill-Duty Series - MD600Z, MD800
CD Series - CD6000, CD8000, CD9000,
and MCF Generators

www.emporiumve.com

Direct Current Motors

Kinamatic II™

Standard Features



HP Range	1 - 500
Base Speed	1150RPM, 1750RPM
Armature Voltage	240V, 500V
Field Voltage	300/150, 240/120
Accessory Mounting	8.5" accessory mounting rabbet with accessory shaft extension
Agency Approvals	CSA
Altitude	3300 ft
Ambient	40°C
Balance/Vibration	Measured at top speed: Peak-to-Peak amplitude 0.0015”
Bearing Caps	Cast iron CD258AT-CD5010AY both DE and CE
Bearing Type	Antifriction ball, CDL182AT-CD2010AT: double shielded, CD258AT-CD5010AY: open
Coils	CD180AT - CD329AT random wound - dip and baked CD360AT - CD5010AY TREC® coils
Conduit Box	Fabricated steel, 360° rotatable, gasketed, oversized
Current Overload	Occasionally repeated loads of 150% of base speed full load current
Endbells	CD182AT-CD500AT: Cast Iron, CD5010AY: CE- cast iron, DE-fabricated steel
Frame Material	Rolled Steel
Frame Size	CD182AT-CD5010AY
Grease	Lithium soap based
Grease Fittings	Alemite
Ground	Bronze bolt in conduit box
Insulation Class	Class F
Insulation System	Armature Treatment: Radiant Heat Process (RHP)
Lifting Means	Two (2) welded lifting lugs
Mounting	F1, modifiable to F2
Nameplate	Stainless Steel
Paint	ANSI #49 grey, heavy duty enamel
Relubrication	CDL182AT-CD2110AT: pre-lubricated, CD258AT-CD5010AY zerk grease fittings
Service Factor	1.0
Temperature Rise	Class F @ rated load and rated base speed
Tests	Routine Test: Report available upon request and purchase order
Warranty	24 months from date of installation or 28 months from date of manufacture; whichever occurs first

DC Motors – Kinamatic™

Type-C Power Supply



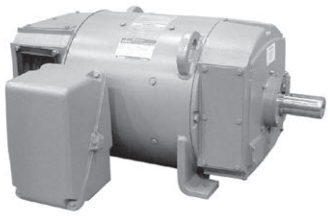
Base Mounted - GE CD180AT-CD500AT
Shunt Wound - Dripproof Fully Guarded - Self Ventilated

HP	RPM	Armature Volts	Field Volts	Armature Amps	Field Amps	Frame	Cat. No.		Wt. (lbs)	C Dim. (in)	Notes
2	1750/2300	240	300/150	7.6	.35/.20	L182AT	**D587**	GO-2AS180	83	15.30	
3	1750/2300	240	300/150	11.0	.34/.23	186AT	**D403**	GO-2AS180	105	16.80	
3	1750/2300	500	300/150	5.1	.55/.30	186AT	**D588**	GO-2AS180	105	16.80	
3	1750/2300	240	240/120	11.0	.44/.28	186ATC	**D404**	GO-2AS180	102	16.80	75
5	1750/2300	240	300/150	18.0	.45/.27	L186AT	**D409**	GO-2AS180	128	18.80	
5	1750/2300	500	300/150	8.5	.72/.42	L186AT	**D407**	GO-2AS180	128	18.80	
5	1750/2300	240	240/120	17.9	.57/.39	L186ATC	**D410**	GO-2AS180	128	18.80	75
7.5	1750/2300	240	300/150	26.5	.95/.52	189AT	**D417**	GO-2AS180	162	20.80	
7.5	1750/2300	500	300/150	13.2	.78/.54	218AT	**D421**	GO-2AS2P	234	24.20	
7.5	1750/2300	240	240/120	28.1	.98/.63	218ATC	**D422**	GO-2AS2P	243	24.20	75
10	1750/2300	240	300/150	36.6	1.12/.64	219AT	**D425**		252	25.20	
10	1750/2300	500	300/150	17.2	1.35/.88	219AT	**D423**		252	25.20	
10	1750/2300	240	240/120	36.6	1.40/.86	219ATC	**D427**		252	25.20	75
15	1750/2300	240	300/150	56.0	1.30/.80	258AT	**D434**	GO-2AS2P	361	27.10	
15	1750/2300	500	300/150	25.2	1.60/.88	258AT	**D432**	GO-2AS2P	361	27.10	
15	1750/2300	240	240/120	55.1	1.67/.89	258ATC	**D435**	GO-2AS2P	378	27.10	75
20	1750/2300	240	300/150	70.5	1.42/.95	259AT	**D441**		403	28.80	
20	1750/2300	500	300/150	35.0	1.53/.83	259AT	**D437**		403	28.80	
25	1750/2300	240	300/150	91.0	1.47/.90	287AT	**D444**	GO-2AS2P	493	31.00	
25	1750/2300	500	300/150	42.7	1.76/1.20	287AT	**D442**	GO-2AS2P	493	31.00	
25	1150/2000	240	300/150	89.0	1.89/1.08	328AT	**D589**	GO-2AS2P	769	35.40	
30	1750/2300	240	300/150	107.0	1.56/1.11	288AT	**D448**		548	32.70	
30	1750/2300	500	300/150	50.4	2.08/1.16	288AT	**D445**		548	32.70	
40	1750/2100	500	300/150	65.4	2.32/1.69	328AT	**D541**	GO-2AS2P	769	35.40	
40	1750/2100	500	300/150	65.4	2.32/1.69	328AT	**D542**	GO-2AS2P	769	35.40	70
40	1150/2000	500	300/150	64.9	2.90/1.35	366AT	**D453**		860	35.90	
50	1750/2100	500	300/150	83.7	2.32/1.70	328AT	**D449**		769	35.40	
50	1750/2100	500	300/150	83.7	2.32/1.70	328AT	**D450**		769	35.40	70
50	1150/2000	500	300/150	80.0	2.50/1.32	368AT	**D543**	GO-2AS4P	1020	38.90	
60	1750/2100	500	300/150	97.4	3.00/2.30	366AT	**D544**		860	35.90	
60	1150/2000	500	300/150	98.0	2.50/1.30	368AT	**D462**		1020	38.90	
60	850/1700	500	300/150	99.0	3.00/1.30	407AT	**D590**		1300	40.10	
75	1750/2100	500	300/150	122.0	3.06/2.30	366AT	**D455**	GO-2AS4P	860	35.90	
75	1750/2100	500	300/150	122.0	3.06/2.30	366AT	**D456**	GO-2AS4P	860	35.90	70
100	1750/2000	500	300/150	161.0	3.80/2.80	368AT	**D465**		1020	38.90	
100	1750/2000	500	300/150	160.0	3.80/2.80	368AT	**D466**		1020	38.90	70
125	1750/2000	500	300/150	200.0	3.06/2.55	407AT	**D471**	GO-2AS4P	1300	40.10	
150	1750/2000	500	300/150	238.0	3.80/3.30	409AT	**D476**		1600	44.60	
150	1750/2000	500	300/150	238.0	3.80/3.30	409AT	**D477**		1600	44.60	70
200	1750/2000	500	300/150	319.0	4.00/3.25	504AT	**D480**	GO-2AS4P	1900	45.70	
250	1750/1900	500	300/150	394.0	8.00/6.68	506AT	**D547**		2290	49.70	
300	1750/1900	500	300/150	473.0	8.00/6.83	506AT	**D486**	GO-2AS4P	2290	49.70	

Notes:
70 F-2 assembly
75 C-Face Mounting

DC Motors – Kinamatic™

Type-C Power Supply



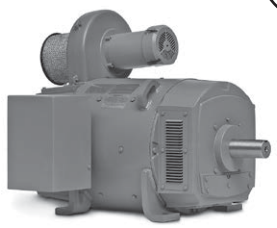
Base Mounted - GE CD180AT-CD500AT
Shunt Wound - Dripproof Fully Guarded - Separately Ventilated

HP	RPM	Armature Volts	Field Volts	Armature Amps	Field Amps	Frame	Cat. No.		Wt. (lbs)	C Dim. (in)	Notes
10	1750/2300	240	300/150	36.6	1.12/0.64	219AT	**D426**	GO-2AS2P	252	25.20	
10	1750/2300	500	300/150	17.2	1.35/0.88	219AT	**D424**	GO-2AS2P	252	25.20	
15	1750/2300	500	300/150	25.2	1.60/0.88	258AT	**D433**	GO-2AS2P	361	27.10	
20	1750/2300	500	300/150	35.0	1.53/0.83	259AT	**D438**	GO-2AS2P	403	28.80	
20	1750/2300	500	300/150	35.0	1.53/0.83	259AT	**D439**	GO-2AS2P	403	28.80	70
30	1750/2300	500	300/150	50.4	2.08/1.16	288AT	**D446**	GO-2AS2P	548	32.70	
40	1750/2100	500	300/150	67.0	2.03/1.32	327AT	**D548**	GO-2AS2P	691	33.40	
40	1150/2000	500	300/150	70.2	2.30/1.01	328AT	**D609**	GO-2AS2P	769	35.30	
50	1750/2100	500	300/150	83.7	2.30/1.70	328AT	**D451**	GO-2AS2P	769	35.30	
50	1150/2000	500	300/150	82.0	2.90/1.35	366AT	**D610**	GO-2AS4P	860	35.90	
60	1750/2100	500	300/150	97.0	2.40/1.60	L328AT	**D576**	GO-2AS2P	888	37.90	
75	1750/2100	500	300/150	125.0	2.40/1.60	329AT	**D577**	GO-2AS2P	888	37.90	
100	1750/2000	500	300/150	160.0	3.90/3.00	368AT	**D558**	GO-2AS4P	1020	38.90	
125	1750/2000	500	300/150	202.0	3.80/3.00	368AT	**D559**	GO-2AS4P	1020	38.90	
125	850/1700	500	300/150	203.0	3.70/1.72	506AT	**D613**	GO-2AS4P	2290	49.70	
150	1750/2000	500	300/150	242.0	4.00/3.37	407AT	**D560**	GO-2AS4P	1300	40.10	
150	850/1700	500	300/150	240.0	9.40/2.90	506AT	**D615**	GO-2AS4P	2290	49.70	
200	1750/2000	500	300/150	318.0	6.10/4.60	L409AT	**D574**	GO-2AS4P	1650	48.10	
250	1750/1900	500	300/150	400.0	4.30/3.87	504AT	**D575**	GO-2AS4P	1900	45.70	
250	1150/1700	500	300/150	401.0	6.50/3.48	506AT	**D618**	GO-2AS4P	2290	49.70	
300	1150/1600	500	300/150	480.0	6.40/4.00	508AT	**D619**	GO-2AS4P	2810	54.70	
400	1750/1900	500	300/150	629.0	6.42/5.50	508AT	**D489**	GO-2AS4P	2810	54.70	
500	1750/1900	500	300/150	781.0	8.10/6.80	5010AY	**D620**	GO-2AS4P	4260	65.50	104

Notes:
70 F-2 assembly
104 4 1/8" shaft diameter

DC Motors – Kinamatic™

Type-C Power Supply



Base Mounted - GE CD180AT-CD500AT
Shunt Wound - Dripproof Fully Guarded - Blower Ventilated

HP	RPM	Armature Volts	Field Volts	Armature Amps	Field Amps	Frame	Cat. No.		Wt. (lbs)	C Dim. (in)	Notes
7.5	1750/2300	240	300/150	26.5	0.95/0.52	189AT	**D418**	GO-2AS180	172	23.00	
10	1750/2300	500	300/150	17.2	1.35/0.88	219AT	**D561**	GO-2AS2P	272	25.20	
15	1750/2300	500	300/150	25.2	1.60/0.88	258AT	**D562**	GO-2AS2P	381	27.10	
20	1750/2300	500	300/150	35.0	1.53/0.83	259AT	**D563**	GO-2AS2P	423	28.80	
20	1150/2000	500	300/150	33.9	1.98/0.94	327AT	**D650**	GO-2AS2P	752	33.40	
25	1750/2300	500	300/150	42.7	1.76/1.20	287AT	**D564**	GO-2AS2P	513	31.00	
25	1150/2000	500	300/150	42.0	2.30/1.02	328AT	**D651**	GO-2AS2P	830	35.30	
30	1750/2300	500	300/150	50.4	2.08/1.16	288AT	**D565**	GO-2AS2P	576	32.70	
40	1750/2100	500	300/150	67.0	2.03/1.32	327AT	**D566**	GO-2AS2P	752	33.40	
50	1750/2100	500	300/150	82.0	2.30/1.70	328AT	**D567**	GO-2AS2P	830	35.30	
60	1750/2100	500	300/150	97.0	2.40/1.55	L328AT	**D578**	GO-2AS2P	949	37.90	
60	1750/2100	500	300/150	97.2	3.40/2.38	365AT	**D652**	GO-2AS4P	815	33.70	
60	1150/2000	500	300/150	97.0	4.00/1.78	368AT	**D654**	GO-2AS4P	1085	38.90	
75	1750/2100	500	300/150	125.0	2.40/1.60	329AT	**D579**	GO-2AS2P	949	37.90	
75	1750/2100	500	300/150	125.0	2.40/1.60	329AT	**D655**	GO-2AS2P	949	37.90	70
75	1750/2100	500	300/150	122.0	2.40/1.85	366AT	**D656**	GO-2AS4P	925	35.90	
75	1750/2100	500	300/150	122.0	2.40/1.85	366AT	**D657**	GO-2AS4P	925	35.90	70
75	1150/2000	500	300/150	123.0	3.80/1.80	368AT	**D658**	GO-2AS4P	1085	38.90	
100	1750/2000	500	300/150	160.0	3.90/3.00	368AT	**D467**	GO-2AS4P	1085	38.90	
100	1150/2000	500	300/150	162.0	7.10/2.96	407AT	**D659**	GO-2AS4P	1365	40.10	
100	850/1700	500	300/150	614.0	6.00/2.40	409AT	**D660**	GO-2AS4P	1665	44.60	
125	1750/2000	500	300/150	202.0	3.80/3.00	368AT	**D468**	GO-2AS4P	1085	38.90	
125	1150/2000	500	300/150	201.0	7.10/3.30	409AT	**D661**	GO-2AS4P	1665	44.60	
150	1750/2000	500	300/150	242.0	4.00/3.37	407AT	**D473**	GO-2AS4P	1365	40.10	
150	1150/2000	500	300/150	244.0	7.29/3.54	409AT	**D662**	GO-2AS4P	1665	44.60	
200	1750/2000	500	300/150	318.0	6.10/4.60	L409AT	**D478**	GO-2AS4P	1720	48.00	
200	1750/2000	500	300/150	318.0	6.10/4.60	L409AT	**D663**	GO-2AS4P	1720	48.00	70
250	1750/1900	500	300/150	400.0	4.30/3.87	504AT	**D482**	GO-2AS4P	1982	45.70	
250	1750/1900	500	300/150	400.0	4.30/3.87	504AT	**D664**	GO-2AS4P	1982	45.70	70
300	850/1500	500	300/150	477.0	12.00/5.10	5010AY	**D490**	GO-2AS4P	4343	65.50	104
400	1150/1500	500	300/150	631.0	8.20/5.50	5010AY	**D492**	GO-2AS4P	4343	65.50	104

Notes:
70 F-2 assembly
104 4 1/8" shaft diameter

DC Motors – Kinamatic™

Type-C Power Supply



Base Mounted - GE CD180AT-CD500AT
Shunt Wound - Totally Enclosed

HP	RPM	Armature Volts	Field Volts	Armature Amps	Field Amps	Frame	Cat. No.		Wt. (lbs)	C Dim. (in)	Notes
1	1750/2300	240	300/150	3.6	0.35/0.22	L182AT	**D681**	GO-2AS180	83	15.30	55
1	1150/2000	240	240/120	3.7	0.53/0.21	L182AT	**D680**	GO-2AS180	83	15.30	55
2	1750/2300	240	300/150	7.1	0.29/0.17	L186AT	**D553**	GO-2AS180	128	18.80	55
3	1750/2300	240	300/150	10.8	0.29/0.17	L186AT	**D530**	GO-2AS180	128	18.80	55
3	1750/2300	500	300/150	5.1	0.45/0.26	L186ATC	**D682**	GO-2AS180	128	18.80	55, 77
5	1750/2300	240	300/150	17.6	0.38/0.24	189AT	**D408**	GO-2AS180	165	23.00	76
5	1750/2300	240	240/120	17.2	0.95/0.65	2110AT	**D684**	GO-2AS2P	280	26.70	55
5	1750/2300	240	300/150	17.2	0.74/0.45	2110AT	**D683**	GO-2AS2P	280	26.70	55
5	1750/2300	500	300/150	8.3	0.60/0.40	189AT	**D415**	GO-2AS180	165	23.00	76
5	1750/2300	500	300/150	8.2	0.76/0.52	2110AT	**D685**	GO-2AS2P	280	26.70	55
7.5	1750/2300	240	300/150	26.2	1.15/0.70	2110AT	**D430**	GO-2AS2P	287	29.30	76
7.5	1750/2300	500	300/150	12.8	0.74/0.44	2110AT	**D429**	GO-2AS2P	287	29.30	76
7.5	1750/2300	500	300/150	12.4	0.91/0.58	259AT	**D686**	GO-2AS2P	403	28.90	55
10	1750/2300	240	300/150	34.3	0.88/0.55	259AT	**D440**	GO-2AS2P	442	31.90	
10	1750/2300	500	300/150	16.3	1.15/0.72	259AT	**D436**	GO-2AS2P	442	31.90	
15	1750/2300	240	300/150	51.7	0.98/0.68	288AT	**D568**	GO-2AS2P	587	36.40	
15	1750/2300	500	300/150	24.5	0.98/0.68	288AT	**D569**	GO-2AS2P	587	36.40	
20	1750/2300	240	300/150	68.5	1.24/0.86	327AT	**D570**	GO-2AS2P	732	37.60	
25	1750/2300	240	300/150	85.0	1.50/1.10	328AT	**D572**	GO-2AS2P	812	39.50	
30	1750/2300	240	300/150	103.0	1.80/1.30	366AT	**D460**	GO-2AS4P	940	40.40	
30	1750/2300	500	300/150	48.7	1.80/1.24	366AT	**D457**	GO-2AS4P	940	40.40	
40	1750/2100	240	300/150	136.0	0.95/0.76	368AT	**D469**	GO-2AS4P	1100	43.40	
40	1750/2100	500	300/150	64.6	1.49/1.20	368AT	**D463**	GO-2AS4P	1100	43.40	
50	1750/2100	500	150/300	80.7	1.49/1.20	409AT	**D554**	GO-2AS4P	1680	49.40	
75	1750/2100	500	300/150	120.0	1.50/1.25	409AT	**D474**	GO-2AS4P	1680	49.40	

Notes:
55 TENV Construction
76 Accessory mounting faces not available for TEFC CD180AT and CD210AT frames
77 8 1/2" C-Face rabbet

DC Motors – Kinamatic™

Type-K Power Supply



Base and End Mounted - NEMA 180-210 Frame
Shunt Wound - Dripproof

HP	RPM	Armature Volts	Field Volts	Armature Amps	Field Amps	Frame	Cat. No.		Wt. (lbs)	C Dim. (in)	Notes
1	1750/2050	180	200/100	4.9	0.44/0.37	L182AT	**D585**	GO-2AS180	83	15.30	
1	1750/2050	180	200/100	4.9	0.44/0.37	L182ACY	**D402**	GO-2AS180	80	15.30	78
1.5	1750/2050	180	200/100	7.3	0.44/0.37	L182ACY	**D536**	GO-2AS180	80	17.50	64, 78
2	1750/2050	180	200/100	9.4	0.59/0.39	186ACY	**D406**	GO-2AS180	102	16.80	78
2	1750/2050	180	200/100	9.4	0.59/0.39	186ATC	**D537**	GO-2AS180	102	16.80	77
3	1750/2050	180	200/100	14.4	0.59/0.39	186ATC	**D539**	GO-2AS180	102	18.80	77
5	2500/2750	180	200/100	23.6	0.93/0.72	186AT	**D586**	GO-2AS180	105	16.80	64
5	1750/2050	180	200/100	24.1	0.75/0.54	L186ATC	**D413**	GO-2AS180	128	18.80	64, 77
5	1750/2050	180	200/100	24.1	0.75/0.54	L186ATC	**D414**	GO-2AS180	128	18.80	77, 88
5	1750/2050	180	200/100	23.7	1.38/0.94	219ATC	**D428**	GO-2AS2P	261	25.20	77



Shunt Wound - Totally Enclosed

HP	RPM	Armature Volts	Field Volts	Armature Amps	Field Amps	Frame	Cat. No.		Wt. (lbs)	C Dim. (in)	Notes
1	1750/2050	180	200/100	5.0	0.28/0.22	L182ATC	**D400**	GO-2AS180	80	15.30	55, 77
1	1750/2050	180	200/100	5.0	0.28/0.22	L182ACY	**D401**	GO-2AS180	80	15.30	55, 78
1.5	1750/2050	180	200/100	7.3	0.37/0.27	186ACY	**D405**	GO-2AS180	102	16.80	55, 78
1.5	1750/2050	180	200/100	7.3	0.37/0.27	186ATC	**D540**	GO-2AS180	102	16.80	55, 77
2	1750/2050	180	200/100	9.5	0.48/0.37	L186ATC	**D411**	GO-2AS180	128	18.80	55, 77
2	1750/2050	180	200/100	9.5	0.48/0.37	L186ACY	**D412**	GO-2AS180	128	18.80	55, 78
3	1750/2050	180	200/100	13.9	0.63/0.46	189ACY	**D555**	GO-2AS180	160	20.80	55, 78
3	1750/2050	180	200/100	13.9	0.63/0.46	189ATC	**D419**	GO-2AS180	160	80.80	55, 77
5	1750/2050	180	200/100	23.3	1.00/0.74	189ATC	**D420**	GO-2AS180	160	20.80	58, 64, 76, 77
5	1750/2050	180	200/100	23.0	0.81/0.63	2110ATC	**D431**	GO-2AS2P	289	26.70	55, 77
5	1750/2050	180	200/100	23.3	1.00/0.74	189AT	**D583**	GO-2AS180	162	20.80	58, 76, 64
5	1750/2050	180	200	23.0	0.80/0.60	2110ACY	**D584**	GO-2AS2P	389	8.50	55, 74, 77

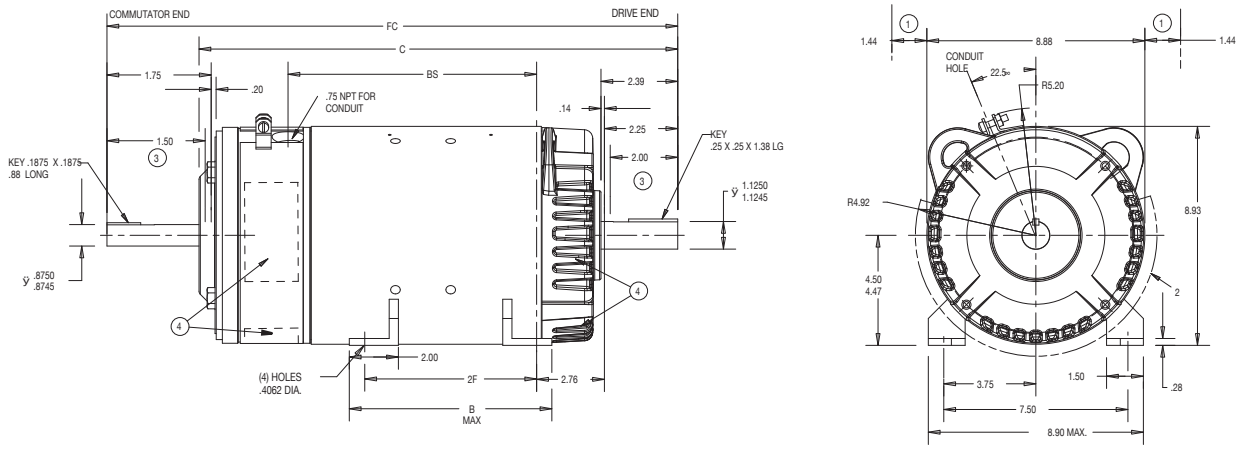
Notes:

55 TENV Construction
58 TEFC Construction
64 Suitable for constant torque to 60% of base speed
74 1.125" diameter shaft
76 Accessory mounting faces not available for TEFC CD180AT and CD210AT frames
77 8 1/2" C-Face rabbet
78 4 1/2" C-Face rabbet
88 Blower provided with filter

DC Motors – Kinamatic™

Type CD, Dripproof Fully Guarded and Totally Enclosed Non-Ventilated, Frames L182AT to 189AT

Motor Dimensions



Frame Size	Approx. Wk2 of Arm. Lb. Ft.²	B	C	FC	2F	BS	Approx. Net. Wt. (lbs) ◊
L182AT	0.28	5.80	15.26	16.51	4.5	6.63	83
186AT	0.45	8.30	16.76	18.01	7.0	8.13	105
L186AT	0.67	8.30	18.76	20.01	7.0	10.13	128
189AT	0.77	11.56	20.76	22.01	10.0	12.13	162

Notes:

1 Splashproof fully guarded machines will have additional covers, increasing the overall width at the commutator-end and drive-end side air openings

2 Dripproof, fully guarded vertical drive-end shaft down machines will have additional covers, increasing the overall width and exceeding bottom feet at the commutator-end openings

3 Represents minimum length of shaft available for hubs

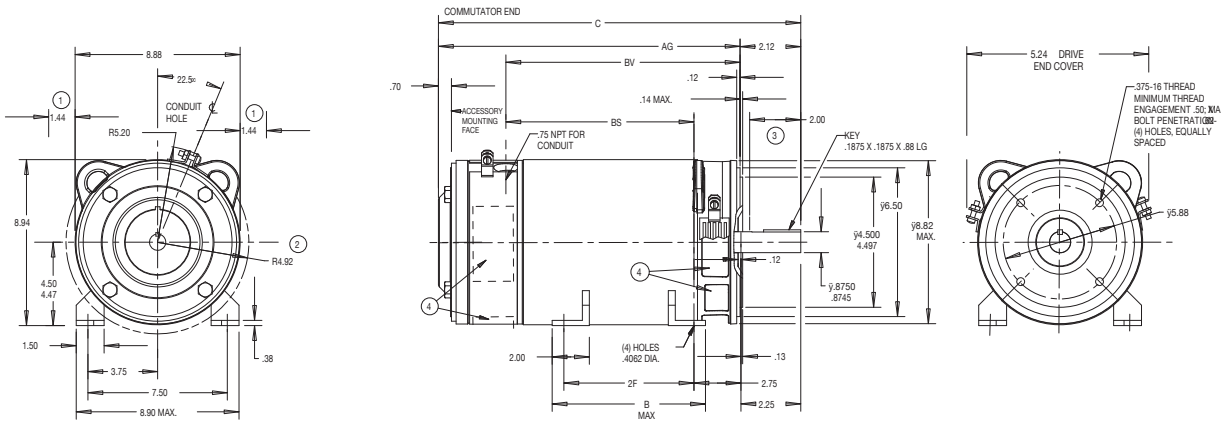
4 Air opening. For enclosure type and mounting position, see enclosure and mounting assembly. Totally enclosed machines will not have openings or covers on drive-end.
The standard single shaft machine has the commutator end bearing bracket and shaft extension prepared to accept accessories. For additional information, see 36C697103AA.
For blower ventilated, blower can only be mounted on side of motor because there is no air opening at the top of the motor. The motor leads exit at the top of the motor.
Commutator-end shaft extension is furnished only when specifically ordered.
Shaft runout shall not exceed 0.002 inch total indicator reading.

◊ For shipping weight add 15% to net weight.

DC Motors – Kinamatic™

Type CD, Dripproof Fully Guarded and Totally Enclosed Non-Ventilated, L182ACY to 189ACY 4 1/2" Type C-Face Mounting with Feet

Motor Dimensions (cont.)



Frame Size	Approx. Wk2 of Arm. Lb. Ft.²	B	C	2F	AG	BS	BV	Approx. Net. Wt. (lbs) ◊
L182ACY	0.28	5.80	15.26	4.5	13.14	6.63	9.51	83
186ACY	0.45	8.30	16.76	7.0	14.64	8.13	11.01	105
L186ACY	0.67	8.30	18.76	7.0	16.64	10.13	13.01	128
189ACY	0.77	11.56	20.76	10.0	18.64	12.13	15.01	162

Notes:

1 Splashproof fully guarded machines will have additional covers, increasing the overall width at the commutator-end and drive-end side air openings

2 Dripproof, fully guarded vertical drive-end shaft down machines will have additional covers, increasing the overall width and exceeding bottom of mounting feet at the commutator-end openings

3 Represents minimum length of shaft available for hubs

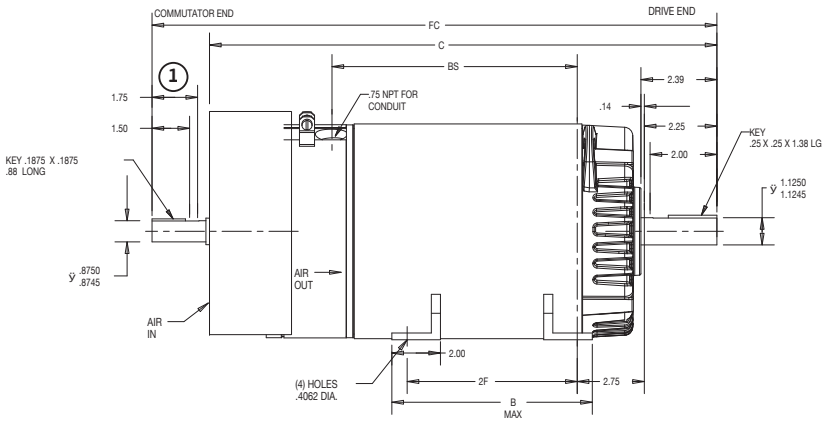
4 Air opening. For enclosure type and mounting position, see enclosure and mounting assembly. Totally enclosed machines will not have openings or covers on drive-end.
Mounting face will be square and rabbet diameter concentric with shaft within .004 inch total indicator reading. Shaft runout not to exceed .002 inch total indicator reading.
Feet will be supplied unless otherwise specified.
The standard single shaft machine has the commutator end bearing bracket and shaft extension prepared to accept accessories. For additional information, see 36C697103AA.

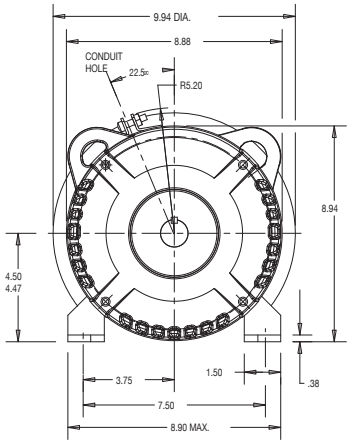
◊ For shipping weight add 15% to net weight.

DC Motors – Kinamatic™

Type CD, Dripproof Fully Guarded and Totally Enclosed Non-ventilated, Frames L182ACY to 189ACY 4 1/2" Type C-Face Mounting with Feet

Motor Dimensions (cont.)





Frame Size	Approx. Wk2 of Arm. Lb. Ft.²	B	C	FC	2F	BS	Approx. Net. Wt. (lbs) ◊
L182ATC	0.28	5.80	17.45	19.47	4.5	6.63	83
186ATC	0.45	8.30	18.95	20.97	7.0	8.13	105
L186ATC	0.67	8.30	20.95	22.97	7.0	10.13	128
189ATC	0.77	11.56	22.95	24.97	10.0	12.13	165

Notes:

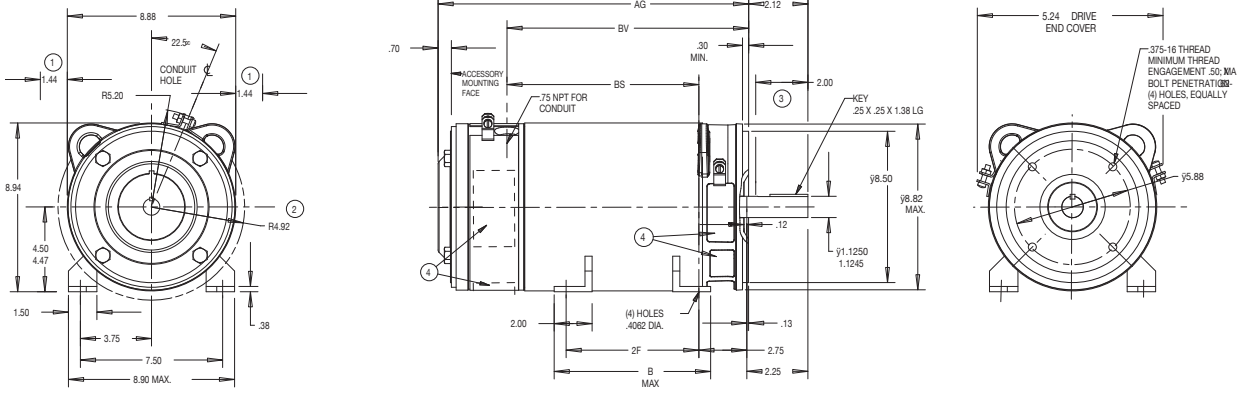
1 Represents minimum length of shaft available for hubs
For mounting position see enclosure and mounting assembly
Shaft runout shall not exceed .002 inch total indicator reading
Commutator end-shaft extension is furnished only when specifically ordered

◊ For shipping weight add 15% to net weight.

DC Motors – Kinamatic™

Type CD, Dripproof Fully Guarded and Totally Enclosed Non-ventilated, Frames L182ATC to 189 ATC 8 1/2" Type C-Face Mounting with Feet

Motor Dimensions (cont.)



Frame Size	Approx. Wk2 of Arm. Lb. Ft.^{2}	B	C	FC	2F	BS	BV
L182ATC	0.28	5.80	15.26	16.51	4.5	6.63	9.51
186ATC	0.45	8.30	16.76	18.01	7.0	8.13	11.01
L186ATC	0.67	8.30	18.76	20.01	7.0	10.13	13.01
189ATC	0.77	11.56	20.76	22.01	10.0	12.13	15.01

Notes:

1 Splashproof fully guarded machines will have additional covers, increasing the overall width at the commutator-end and drive-end side air openings

2 Dripproof, fully guarded vertical drive-end shaft down machines will have additional covers, increasing the overall width and exceeding bottom of mounting feet at the commutator-end openings

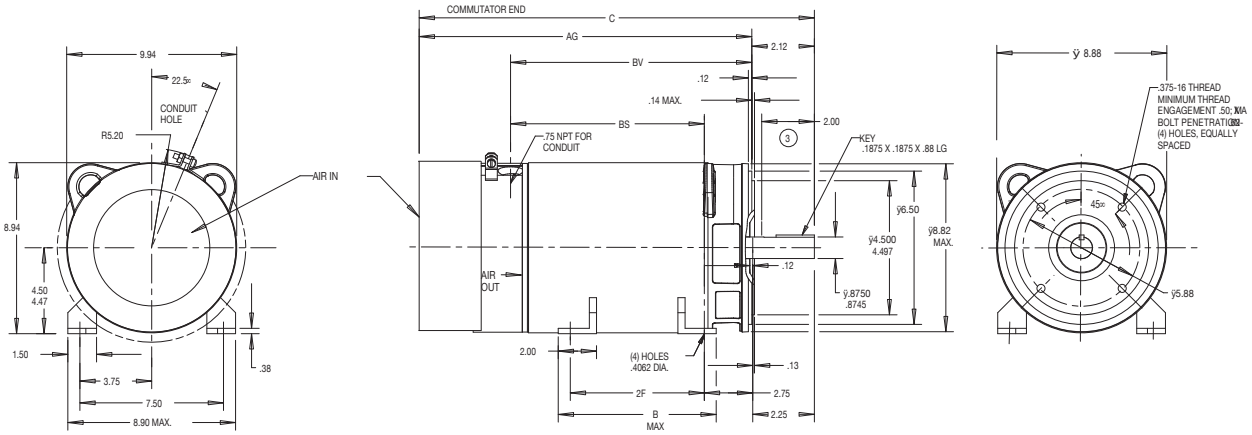
3 Represents minimum length of shaft available for hubs

4 Air opening. For enclosure type and mounting position, see enclosure and mounting assembly. Totally enclosed machines will not have openings or covers on drive-end.
Mounting face will be square and rabbet diameter concentric with shaft within .004 inch total indicator reading. Shaft runout not to exceed .002 inch total indicator reading.
Feet will be supplied unless otherwise specified.
The standard single shaft machine has the commutator end bearing bracket and shaft extension prepared to accept accessories. For additional information, see 36C697103AA.

DC Motors – Kinamatic™

Type CD, Totally Enclosed Fan Cooled, Frames L182ACY to 189 ACY 4 1/2" Type C-Face Mounting with Feet

Motor Dimensions (cont.)



Frame Size	Approx. Wk2 of Arm. Lb. Ft.²	B	C	2F	AG	BS	BV	Approx. Net. Wt. (lbs) ◊
L182ACY	0.28	5.80	17.45	4.5	15.33	6.63	9.51	83
186ACY	0.45	8.30	18.95	7.0	16.83	8.13	11.01	105
L186ACY	0.67	8.30	20.95	7.0	18.83	10.13	13.01	128
189ACY	0.77	11.56	22.95	10.0	20.83	12.13	15.01	165

Notes:

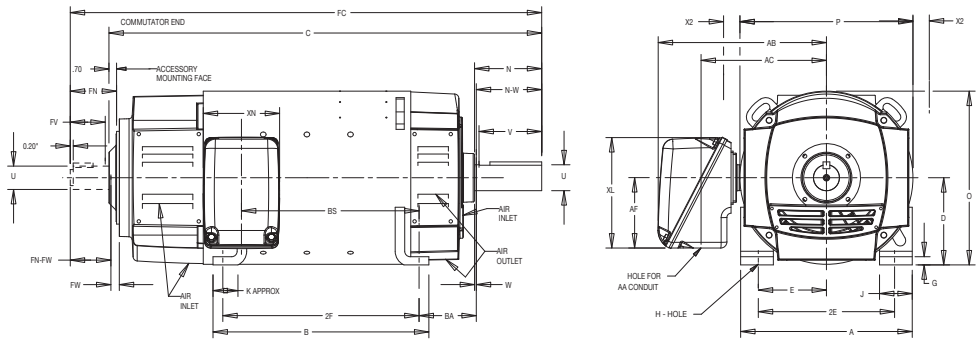
3 Represents minimum length of shaft available for hubs
For mounting position see enclosure and mounting assembly
Mounting face will be square and rabbet diameter concentric with shaft within .004 inch total indicator
Feet will be supplied unless otherwise specified

◊ For shipping weight add 15% to net weight.

DC Motors – Kinamatic™

Type CD, Dripproof Fully Guarded Splashproof, Totally Enclosed Non-ventilated, Frames 218AT to 329AT with Feet*

Motor Dimensions (cont.)



Frame Size	Approx. Net Wt. (lbs) ◊	Approx. Wk2 of Arm. Lb. Ft²	Drive End Key			Commutator End Key			Dimensions in Inches									
			Width	Thick	Length ±.03	Width	Thick	Length ±.03	A Max	B Max	C	D(1)	E	2F	G	H	J	K
218AT	234	1.35	0.3125	0.3125	1.75	0.2500	0.2500	1.00	10.40	11.56	24.22	5.25	4.25	10.0	0.50	0.4062	2.00	2.2
219AT	252	1.49	0.3125	0.3125	1.75	0.2500	0.2500	1.00	10.40	12.56	25.22	5.25	4.25	11.0	0.50	0.4062	2.00	2.2
2110AT	580	1.17	0.3125	0.3125	1.75	0.2500	0.2500	1.00	10.40	14.06	26.72	5.25	4.25	12.5	0.50	0.4062	2.00	2.2
258AT	361	2.91	0.3750	0.3750	2.25	0.3125	0.3125	1.50	12.40	14.06	27.14	6.25	5.00	12.5	0.62	0.5312	2.25	2.0
259AT	403	3.31	0.3750	0.3750	2.25	0.3125	0.3125	1.50	12.40	15.56	28.76	6.25	5.00	14.0	0.62	0.5312	2.25	2.0
287AT	493	4.67	0.5000	0.5000	2.25	0.3750	0.3750	2.00	13.88	14.16	30.98	7.00	5.50	12.5	0.64	0.5312	2.50	2.0
288AT	548	5.36	0.5000	0.5000	2.50	0.3750	0.3750	2.00	13.88	15.66	32.72	7.00	5.50	14.0	0.64	0.5312	2.50	2.0
327AT	691	8.45	0.5000	0.5000	2.50	0.5000	0.5000	2.25	15.88	15.96	33.44	8.00	6.25	14.0	0.75	0.6562	3.00	2.3
328AT	769	9.67	0.5000	0.5000	3.00	0.5000	0.5000	2.25	15.88	17.96	35.32	8.00	6.25	16.0	0.75	0.6562	3.00	2.3
L328AT	888		0.5000	0.5000	3.00	0.5000	0.5000	2.25	15.88	19.96	37.94	8.00	6.26	16.0	0.75	0.6562	3.00	2.3
329AT	888	11.40	0.5000	0.5000	3.00	0.5000	0.5000	2.25	15.88	19.96	37.94	8.00	6.25	18.0	0.75	0.6562	3.00	2.3

Frame Size	Dimensions in Inches														
	AA = 1.25					AA = 2.00					AA = 3.00				
	AB	AC	AF	XL	XN	AB	AC	AF	XL	XN	AB	AC	AF	XL	XN
210AT	9.62	7.56	3.62	5.94	4.38	11.48	8.92	4.62	7.38	5.38	Not Available				
250AT	10.62	8.58	3.62	5.94	4.38	11.74	9.18	4.62	7.38	5.38					
280AT	11.34	9.28	3.62	5.94	4.38	12.46	9.90	4.62	7.38	5.38	14.90	11.28	6.62	10.50	8.56
320AT	Not Available					13.44	10.88	4.62	7.38	5.38	15.12	11.50	6.62	10.50	8.56

Frame Size	Dimensions in Inches														
	N	O	P	U(4)	V(3)	W	N-W	BA	FC	FN	FU(4)	FV(3)	FW	FN-FW	BS	XZ(2)
218AT	2.91	10.46	10.42	1.38	2.5	0.16	2.75	3.50	25.97	2.45	1.125	2.0	0.2	2.25	8.36	1.5
219AT	2.91	10.46	10.42	1.38	2.5	0.16	2.75	3.50	26.97	2.45	1.125	2.0	0.2	2.25	9.36	1.5
2110AT	2.91	10.46	10.42	1.38	2.5	0.16	2.75	3.50	28.47	2.45	1.125	2.0	0.2	2.25	10.87	1.5
258AT	3.41	12.46	12.42	1.63	3.0	0.16	3.25	4.25	29.39	2.95	1.375	2.5	0.2	2.75	9.65	1.5
259AT	3.41	12.46	12.42	1.63	3.0	0.16	3.25	4.25	31.01	2.95	1.375	2.5	0.2	2.75	11.26	1.5
287AT	3.91	13.94	13.88	1.88	3.5	0.16	3.75	4.75	33.75	3.45	1.625	3.0	0.2	3.25	10.89	1.5
288AT	3.91	13.94	13.88	1.88	3.5	0.16	3.75	4.75	35.47	3.45	1.625	3.0	0.2	3.25	12.62	1.5
327AT	4.41	15.94	15.88	2.13	4.0	0.16	4.25	5.25	36.69	3.95	1.875	3.5	0.2	3.75	11.80	1.5
328AT	4.41	15.94	15.88	2.13	4.0	0.16	4.25	5.25	38.57	3.95	1.875	3.5	0.2	3.75	13.68	1.5
L328AT	4.41	15.94	15.87	2.13	4.0	0.02	4.25	5.25	41.19	3.95	1.875	3.5	0.2	3.75	16.30	1.5
329AT	4.41	15.94	15.88	2.13	4.0	0.16	4.25	5.25	41.19	3.95	1.875	3.5	0.2	3.75	16.30	1.5

Notes:

* Dripproof, fully guarded machines can be used for wall or ceiling mounting. Assembly modifications must be made to maintain proper enclosure.

1 Dimensions "D" will not be exceeded. When exact dimension is required, shims up to .03 inches may be necessary where dimension "D" is 8 inches or less. When dimension "D" is over 8 inches, shims up to .06 inch may be necessary.

2 Splashproof machines will have additional covers, increasing the overall width at the commutator end and drive end side cover openings.

3 "V" represents minimum length of shaft available for hubs.

4 Shaft diameters 1.5 inches and smaller will come within the limits of +0.0000 inch -0.0005 inch. Diameters larger than 1.5 inches will come within the limits of +0.0000 inch -0.0010 inch. Shaft runout on diameters 1.625 inches and smaller shall not exceed .002 inch indicator reading. Diameters larger than 1.625 inches shall not exceed .003 inch indicator reading.

◊ For shipping weight add 15% to net weight.

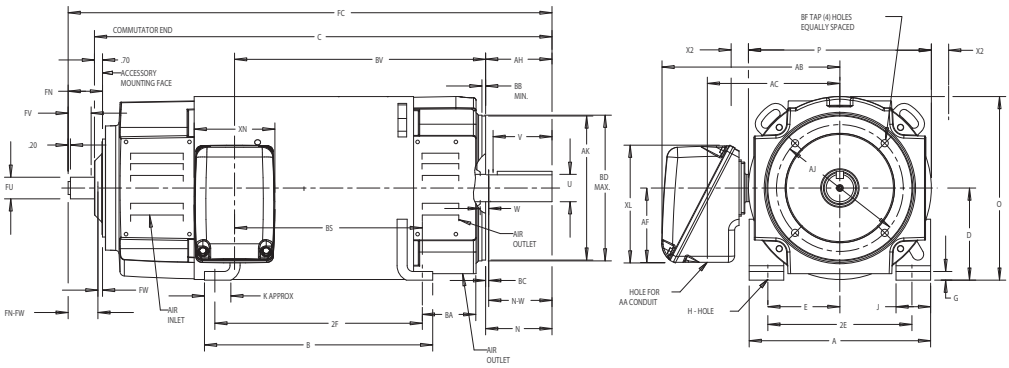
Conduit box will be assembled on the right hand side facing the commutator end for motors, and on the left hand side facing the commutator end for generators. Conduit box will be assembled on opposite side of frame, if so specified. Conduit box may be oriented to accommodate customer's application. Dimensions pertaining to conduit boxes vary according to rating. Contact your dealer for dimensions.

The standard single shaft machine has the commutator end bearing bracket and shaft prepared to accept accessories. Commutator end shaft extension is furnished only when specifically ordered, and is prepared for accessory drive.

DC Motors – Kinamatic™

Type CD, Dripproof Fully Guarded Splashproof, Totally Enclosed Non-ventilated Frames 218ATC to 329ATC with feet*

Motor Dimensions (cont.)



Frame Size	Approx Net Wt. (lbs) ◊	Approx Wk2 of Arm Lb. Ft²	Drive End Key			Comm. End Key			Dimensions in Inches																	
			Width	Thick	Length ±.03	Width	Thick	Length ±.03	A Max	B Max	C	D(1)	E	2F	G	H	J	K	N	O	P	U(4)	V(3)	W	N-W
218ATC	234	1.35	0.3125	0.3125	1.75	0.2500	0.2500	1.00	10.40	11.56	24.22	5.25	4.25	10.0	0.50	0.4062	2.00	2.2	2.97	10.46	10.42	1.375	2.5	0.22	2.75
219ATC	261	1.49	0.3125	0.3125	1.75	0.2500	0.2500	1.00	10.40	12.56	25.22	5.25	4.25	11.0	0.50	0.4062	2.00	2.2	2.97	10.46	10.42	1.375	2.5	0.22	2.75
2110ATC	389	1.71	0.3125	0.3125	1.75	0.2500	0.2500	1.00	10.40	14.06	26.72	5.25	4.25	12.5	0.50	0.4062	2.00	2.2	2.97	10.46	10.42	1.375	2.5	0.22	2.75
258ATC	378	2.91	0.3750	0.3750	2.25	0.3125	0.3125	1.50	12.40	14.06	27.14	6.25	5.00	12.5	0.62	0.5312	2.25	2.0	3.47	12.46	12.42	1.625	3.0	0.22	3.25
259ATC	420	3.31	0.3750	0.3750	2.25	0.3125	0.3125	1.50	12.40	15.56	28.76	6.25	5.00	14.0	0.62	0.5312	2.25	2.0	3.47	12.46	12.42	1.625	3.0	0.22	3.25
287ATC	522	4.67	0.5000	0.5000	2.50	0.3750	0.3750	2.00	13.88	14.16	30.98	7.00	5.50	12.5	0.64	0.5312	2.50	2.0	3.97	13.94	13.88	1.875	3.5	0.22	3.75
288ATC	577	5.36	0.5000	0.5000	2.50	0.3750	0.3750	2.00	13.88	15.66	32.72	7.00	5.50	14.0	0.64	0.5312	2.50	2.0	3.97	13.94	13.88	1.875	3.5	0.22	3.75
327ATC	720	8.45	0.5000	0.5000	3.00	0.5000	0.5000	2.25	15.88	15.96	33.44	8.00	6.25	14.0	0.75	0.6562	3.00	2.3	4.47	15.94	15.88	2.125	4.0	0.22	4.25
328ATC	798	9.67	0.5000	0.5000	3.00	0.5000	0.5000	2.25	15.88	17.96	35.32	8.00	6.25	16.0	0.75	0.6562	3.00	2.3	4.47	15.94	15.88	2.125	4.0	0.22	4.25
329ATC	917	11.40	0.5000	0.5000	3.00	0.5000	0.5000	2.25	15.88	19.96	37.94	8.00	6.25	18.0	0.75	0.6562	3.00	2.3	4.47	15.94	15.88	2.125	4.0	0.22	4.25

Frame Size	Dimensions in Inches														
	AA = 1.25					AA = 2.00					AA = 3.00				
	AB	AC	AF	XL	XN	AB	AC	AF	XL	XN	AB	AC	AF	XL	XN
210ATC	9.62	7.56	3.62	5.94	4.38	11.48	8.92	4.62	7.38	5.38	Not Available				
250ATC	10.62	8.56	3.62	5.94	4.38	11.74	9.18	4.62	7.38	5.38					
280ATC	11.34	9.28	3.62	5.94	4.38	12.46	9.90	4.62	7.38	5.38	14.90	11.28	6.62	10.50	8.56
320ATC	Not Available					13.44	10.88	4.62	7.38	5.38	15.12	11.50	6.62	10.50	8.56

Frame Size	Dimensions in Inches																
	BA	BB Min	FN	FU(4)	BC	BF		FV(3)	FW	FN-FW	AH	AJ	AK	ZA(2)	BD Max	BV	BS	FC
						Tap	Depth											
218ATC	3.50	0.3	2.45	1.125	0.25	.500-13	1.00	2.0	0.2	2.25	1.125	7.25	8.5	1.5	9.00	12.11	8.36	25.97
219ATC	3.50	0.3	2.45	1.125	0.25	.500-13	1.00	2.0	0.2	2.25	1.125	7.25	8.5	1.5	9.00	13.11	9.36	26.97
2110ATC	3.50	0.3	2.45	1.125	0.25	.500-13	1.00	2.0	0.2	2.25	2.500	7.25	8.5	1.5	9.00	14.62	10.87	28.47
258ATC	4.25	0.3	2.95	1.375	0.24	.500-13	1.00	2.5	0.2	2.75	2.500	7.25	8.5	1.5	10.00	14.14	9.65	29.39
259ATC	4.25	0.3	2.95	1.375	0.24	.500-16	1.00	2.5	0.2	2.75	2.500	7.25	8.5	1.5	10.00	15.75	11.26	31.01
287ATC	4.75	0.3	3.45	1.625	0.24	.500-13	1.00	3.0	0.2	3.25	3.000	9.00	10.5	1.5	11.25	15.88	10.87	33.73
288ATC	4.75	0.3	3.45	1.625	0.24	.500-13	1.00	3.0	0.2	3.25	3.000	9.00	10.5	1.5	11.25	17.61	12.62	35.47
327ATC	5.25	0.3	3.95	1.875	0.24	.500-11	1.25	3.5	0.2	3.75	3.750	11.00	12.5	1.5	14.00	17.29	11.80	36.69
328ATC	5.25	0.3	3.95	1.875	0.24	.500-11	1.25	3.5	0.2	3.75	3.750	11.00	12.5	1.5	14.00	19.17	13.68	38.57
329ATC	5.25	0.3	3.95	1.875	0.24	.500-11	1.25	3.5	0.2	3.75	3.750	11.00	12.5	1.5	14.00	21.79	13.68	41.19

Notes:

* Dripproof, fully guarded machines can be used for wall or ceiling mounting. Assembly modifications must be made to maintain proper enclosure.

1 Dimensions "D" will not be exceeded. When exact dimension is required, shims up to .03 inches may be necessary where dimension "D" is 8 inches or less. When dimension "D" is over 8 inches, shims up to .06 inch may be necessary.

2 Splashproof machines will have additional covers, increasing the overall width at the commutator end and drive end side cover openings.

3 "V" represents minimum length of shaft available for hubs.

4 Shaft diameters 1.5 inches and smaller will come within the limits of +0.0000 inch -0.0005 inch. Diameters larger than 1.5 inches will come within the limits of +0.0000 inch -0.0010 inch. Shaft runout on diameters 1.625 inches and smaller shall not exceed .002 inch indicator reading. Diameters larger than 1.625 inches shall not exceed .003 inch indicator reading.

◊ For shipping weight add 15% to net weight.

Conduit box will be assembled on the right hand side facing the commutator end for motors, and on the left hand side facing the commutator end for generators. Conduit box will be assembled on opposite side of frame, if so specified. Conduit box may be oriented to accommodate customer's application. Dimensions pertaining to conduit boxes vary according to rating. Contact your dealer for dimensions.

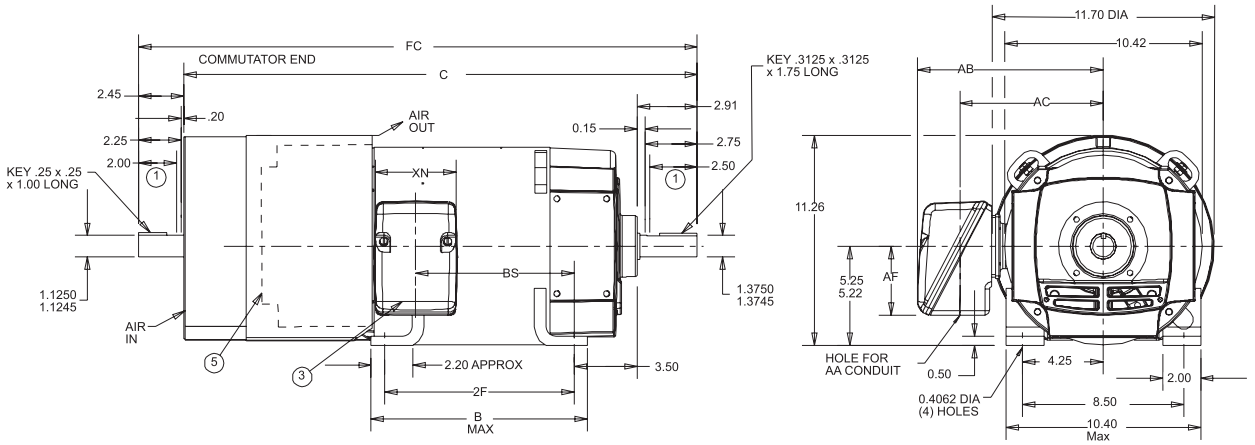
The standard single shaft machine has the commutator end bearing bracket and shaft prepared to accept accessories.

Commutator end shaft extension is furnished only when specifically ordered, and is prepared for accessory drive.

DC Motors – Kinamatic™

Type CD, Totally Enclosed Fan Cooled, Frames 218AT to 2110AT with Feet

Motor Dimensions (cont.)



Frame Size	B	C	FC	2F	BS	Approx. Net. Wt. (lbs) ◊
218AT	11.56	26.82	29.34	10.00	8.36	241
219AT	12.56	27.82	30.34	11.00	9.36	259
2110AT	14.06	29.32	31.84	12.50	10.87	287

Conduit Box Dimensions

AA	AB	AC	AF	XL	XN
1.25	9.62	7.56	3.62	5.94	4.38
2.00	11.48	8.92	4.62	7.38	5.38

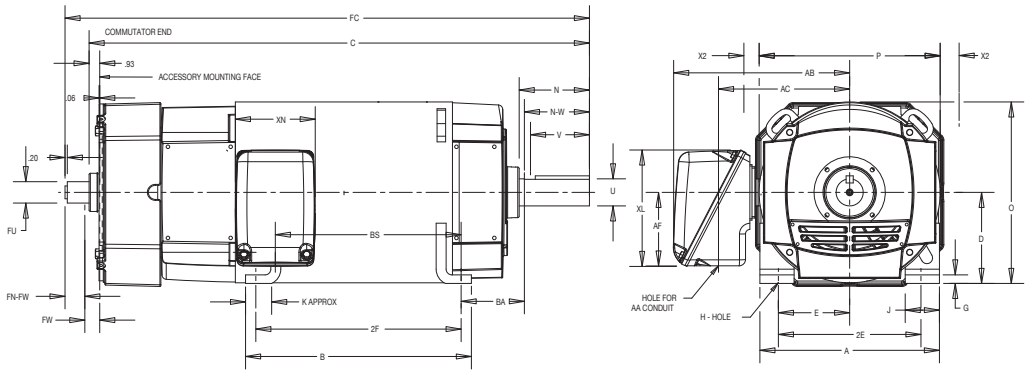
Notes:

1 Represents minimum length of shaft available for hubs
2 Machine can be used for wall or ceiling mounting
3 Conduit box may be turned so that entrance can be made upward, downward, from commutator-end or drive-end, providing mounting conditions permit. Conduit box will be assembled on opposite side of frame, if so specified. Dimensions pertaining to conduit boxes vary according to rating.
4 Shaft run-out shall no exceed 0.002 inch total indicator reading on drive-end
5 Shroud is removable to permit access to hand-hole covers
6 Commutator-end shaft extension is furnished only when specifically ordered.
◊ For shipping weight add 15% to net weight.

DC Motors – Kinamatic™

Type CD, Totally Enclosed Fan Cooled, Frames 285AT to 328AT with Feet

Motor Dimensions (cont.)



Frame Size	Approx. Net Wt. (lbs) ◊	Approx. Wk2 of Arm. Lb. Ft²	Drive End Key			Commutator End Key			Dimensions in Inches									
			Width	Thick	Length ±.03	Width	Thick	Length ±.03	A Max	B Max	C	D(1)	E	2F	G	H	J	K
258AT	397	3.17	0.375	0.375	2.25	0.3125	0.3125	1.50	12.40	14.06	30.32	6.25	5.00	12.5	0.62	0.5312	2.25	2.0
259AT	442	3.57	0.375	0.375	2.25	0.3125	0.3125	1.50	12.40	15.56	31.94	6.25	5.00	14.0	0.62	0.5312	2.25	2.0
287AT	532	5.09	0.500	0.500	2.50	0.3750	0.3750	2.00	13.88	14.16	34.66	7.00	5.50	12.5	0.64	0.5312	2.50	2.0
288AT	587	5.78	0.500	0.500	2.50	0.3750	0.3750	2.00	13.88	15.66	36.40	7.00	5.50	14.0	0.64	0.5312	2.50	2.0
327AT	732	9.20	0.500	0.500	3.00	0.5000	0.5000	2.25	15.88	15.96	37.62	8.00	6.25	14.0	0.75	0.6562	3.00	2.3
328AT	812	10.42	0.500	0.500	3.00	0.5000	0.5000	2.25	15.88	17.96	39.50	8.00	6.25	16.0	0.75	0.6562	3.00	2.3

Frame Size	Dimensions in Inches															
	N	O	P	U(3)	V(2)	W	N-W	BA	FC	FN	FU(3)	FV(2)	FW	FN-FW	BS	XP
258AT	3.41	12.75	13.00	1.625	3.0	0.16	3.25	4.25	32.64	3.25	1.375	2.5	0.5	2.75	9.65	12.42
259AT	3.41	12.75	13.00	1.625	3.0	0.16	3.25	4.25	34.26	3.25	1.375	2.5	0.5	2.75	11.26	12.42
287AT	3.91	14.25	14.52	1.875	3.5	0.16	3.75	4.75	37.48	3.75	1.625	3.0	0.5	3.25	10.89	13.88
288AT	3.91	14.25	14.52	1.875	3.5	0.16	3.75	4.75	39.22	3.75	1.625	3.0	0.5	3.25	12.62	13.88
327AT	4.41	16.25	16.52	2.125	4.0	0.16	4.25	5.25	40.94	4.25	1.875	3.5	0.5	3.75	11.80	15.88
328AT	4.41	16.25	16.52	2.125	4.0	0.16	4.25	5.25	42.82	4.25	1.875	3.5	0.5	3.75	13.68	15.88

Frame Size	Dimensions in Inches														
	AA = 1.25					AA = 2.00					AA = 3.00				
	AB	AC	AF	XL	XN	AB	AC	AF	XL	XN	AB	AC	AF	XL	XN
210AT	9.62	7.56	3.62	5.94	4.38	11.48	8.92	4.62	7.38	5.38	Not Available				
250AT	10.62	8.56	3.62	5.94	4.38	11.74	9.18	4.62	7.38	5.38					
280AT	11.34	9.28	3.62	5.94	4.38	12.46	9.90	4.62	7.38	5.38	14.90	11.28	6.62	10.50	8.56
320AT	Not Available					13.44	10.88	4.62	7.38	5.38	15.12	11.50	6.62	10.50	8.56

Notes:

1 Dimensions "D" will not be exceeded. When exact dimension is required, shims up to .03 inches may be necessary where dimension "D" is 8 inches or less. When dimension "D" is over 8 inches, shims up to .06 inch may be necessary.

2 "V" represents minimum length of shaft available for hubs.

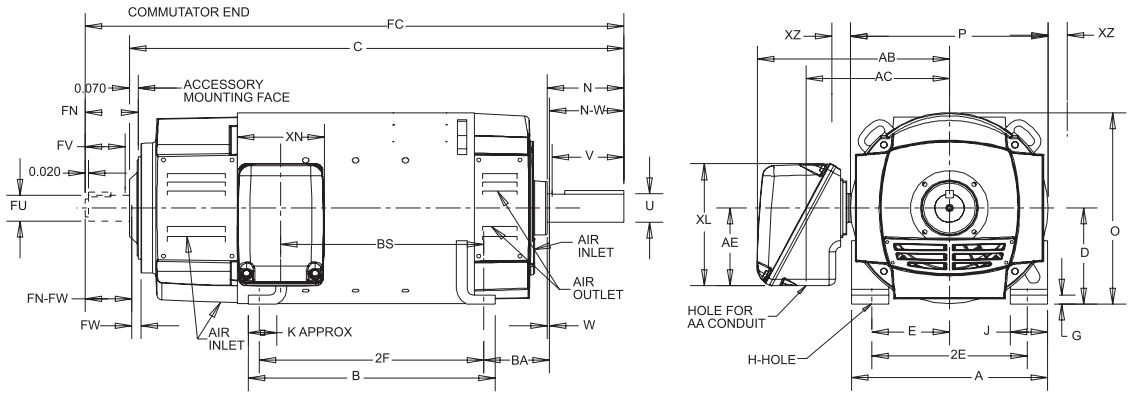
3 Shaft diameters 1.5 inches and smaller will come within the limits of +0.0000 inch -0.0005 inch. Diameters larger than 1.5 inches will come within the limits of +0.0000 inch -0.0010 inch. Shaft runout on diameters 1.625 inches and smaller shall not exceed .002 inch indicator reading. Diameters larger than 1.625 inches shall not exceed .003 inch indicator reading.

◊ For shipping weight add 15% to net weight.
Conduit box will be assembled on the right hand side facing the commutator end for motors, and on the left hand side facing the commutator end for generators. Conduit box will be assembled on opposite side of frame, if so specified. Conduit box may be oriented to accommodate customer's application. Dimensions pertaining to conduit boxes vary according to rating. Contact your dealer for dimensions.
The standard single shaft machine has the commutator end bearing bracket and shaft prepared to accept accessories.
Commutator end shaft extension is furnished only when specifically ordered, and is prepared for accessory drive.

DC Motors – Kinamatic™

Type CD, Dripproof Fully Guarded, Splashproof, Totally Enclosed Non-ventilated, Frames 365AT to 5010AY with Feet*

Motor Dimensions (cont.)



Frame Size	Approx. Net Wt. (lbs)◊	Approx. Wk2 of Arm. Lb. Ft²	Drive End Key			Commutator End Key			Dimensions in Inches										
			Width	Thick	Length ±.03	Width	Thick	Length ±.03	A Max	B Max	C	D(1)	E	2F	G	H	J	K	N
365AT	750	15.61	0.625	0.625	3.50	0.500	0.500	3.00	17.92	14.16	33.70	9.0	7	12.25	0.74	0.8125	3.26	2.31	4.92
366AT	860	18.27	0.625	0.625	3.50	0.500	0.500	3.00	17.92	15.90	35.90	9.0	7	14.00	0.74	0.8125	3.26	2.31	4.92
368AT	1020	22.21	0.625	0.625	3.50	0.500	0.500	3.00	17.92	19.90	38.90	9.0	7	18.00	0.74	0.8125	3.26	2.31	4.92
407AT	1300	35.47	0.625	0.625	4.00	0.625	0.625	3.50	20.00	20.16	40.12	10.0	8	18.00	0.86	0.9375	4.00	2.38	5.42
L407AT	1350	35.54	0.625	0.625	4.00	0.625	0.625	3.50	20.00	20.16	43.52	10.0	8	18.00	0.86	0.9375	4.00	2.38	5.42
409AT	1600	43.81	0.625	0.625	4.00	0.625	0.625	3.50	20.00	24.16	44.62	10.0	8	22.00	0.86	0.9375	4.00	2.38	5.42
L409AT	1650	43.88	0.625	0.625	4.00	0.625	0.625	3.50	20.00	24.16	48.02	10.0	8	22.00	0.86	0.9375	4.00	2.38	5.42
504AT	1900	79.10	0.750	0.750	5.25	0.750	0.750	4.50	24.92	18.96	45.74	12.5	10	16.00	1.11	1.1875	4.50	3.00	6.67
L504AT	2070	79.15	0.750	0.750	5.25	0.750	0.750	4.50	24.92	18.96	47.50	12.5	10	16.00	1.11	1.1875	4.50	3.00	6.67
506AT	2290	98.76	0.750	0.750	5.25	0.750	0.750	4.50	24.92	22.96	49.74	12.5	10	20.00	1.11	1.1875	4.50	3.00	6.67
L506AT	2440	98.81	0.750	0.750	5.25	0.750	0.750	4.50	24.92	22.96	51.50	12.5	10	20.00	1.11	1.1875	4.50	3.00	6.67
508AT	2810	121.87	0.750	0.750	5.25	0.750	0.750	4.50	24.92	27.96	54.74	12.5	10	25.00	1.11	1.1875	4.50	3.00	6.67
L508AT	2970	122.92	0.750	0.750	5.25	0.750	0.750	4.50	24.92	27.96	56.50	12.5	10	25.00	1.11	1.1875	4.50	3.00	6.67
5010AY	4260	157.28	1.000	1.000	6.50	0.750	0.750	5.25	24.92	34.88	65.49	12.5	10	32.00	1.11	1.1875	4.50	3.00	8.42

Frame Size	Dimensions Continued (For Conduit Box Dimensions, refer to publication GEP-387K, Page 124)													BS			XZ(2)
	O	P	U(4)	V(3)	W	N-W	BA	FC	FN	FU(4)	FV(3)	FW	FN-FW	AA = 3"	AA = 4"	AA = (2) 4"	AA = Blank	
365AT	17.91	17.90	2.375	4.50	0.17	4.75	5.875	37.45	4.45	2.125	4.00	0.2	4.25	9.02	9.02	6.64	-	0.25
366AT	17.91	17.90	2.375	4.50	0.17	4.75	5.875	39.65	4.45	2.125	4.00	0.2	4.25	11.22	11.22	8.84	-	0.25
368AT	17.91	17.90	2.375	4.50	0.17	4.75	5.875	32.65	4.45	2.125	4.00	0.2	4.25	14.22	14.22	11.84	-	0.25
407AT	20.15	20.38	2.625	5.00	0.17	5.25	6.625	44.37	4.95	2.375	4.50	0.2	4.75	15.18	15.18	12.80	12.80	-
L407AT	20.15	20.38	2.625	5.00	0.17	5.25	6.625	47.77	4.95	2.375	4.50	0.2	4.75	15.18	15.18	12.80	12.80	-
409AT	20.15	20.38	2.625	5.00	0.17	5.25	6.625	48.87	4.95	2.375	4.50	0.2	4.75	19.68	19.68	17.30	17.30	-
L409AT	20.15	20.38	2.625	5.00	0.17	5.25	6.625	52.27	4.95	2.375	4.50	0.2	4.75	19.68	19.68	17.30	17.30	-
504AT	25.15	25.38	3.250	6.25	0.17	6.50	8.500	50.99	5.95	2.875	5.50	0.2	5.75	-	13.26	10.88	10.88	-
L504AT	25.15	25.38	3.250	6.25	0.17	6.50	8.500	52.75	5.95	2.875	5.50	0.2	5.75	-	-	-	11.16	-
506AT	25.15	25.38	3.250	6.25	0.17	6.50	8.500	54.99	5.95	2.875	5.50	0.2	5.75	-	17.26	14.88	14.88	-
L506AT	25.15	25.38	3.250	6.25	0.17	6.50	8.500	56.75	5.95	2.875	5.50	0.2	5.75	-	-	-	15.16	-
508AT	25.15	25.38	3.250	6.25	0.17	6.50	8.500	59.99	5.95	2.875	5.50	0.2	5.75	-	22.26	19.88	19.88	-
L508AT	25.15	25.38	3.250	6.25	0.17	6.50	8.500	61.75	5.95	2.875	5.50	0.2	5.75	-	-	-	20.16	-
5010AY	25.17	25.38	4.125	8.00	0.17	8.25	8.500	71.49	6.70	3.250	6.25	0.2	6.50	-	31.26	28.88	28.88	-

Notes:

* Dripproof, fully guarded machines can be used for wall or ceiling mounting. Assembly modifications must be made to maintain proper enclosure.

1 Dimensions "D" will not be exceeded. When exact dimension is required, shims up to .03 inches may be necessary where dimension "D" is 8 inches or less. When dimension "D" is over 8 inches, shims up to .06 inch may be necessary.

2 Splashproof machines will have additional covers, increasing the overall width at the commutator end and drive end side cover openings.

3 "V" represents minimum length of shaft available for hubs.

4 Shaft diameters 1.5 inches and smaller will come within the limits of +0.0000 inch -0.0005 inch. Diameters larger than 1.5 inches will come within the limits of +0.0000 inch -0.0010 inch. Shaft runout on diameters 1.625 inches and smaller shall not exceed .002 inch indicator reading. Diameters larger than 1.625 inches shall not exceed .003 inch indicator reading.

◊ For shipping weight add 15% to net weight.

Conduit box will be assembled on the right hand side facing the commutator end for motors, and on the left hand side facing the commutator end for generators. Conduit box will be assembled on opposite side of frame, if so specified. Conduit box may be oriented to accommodate customer's application. Dimensions pertaining to conduit boxes vary according to rating. Contact your dealer for dimensions.

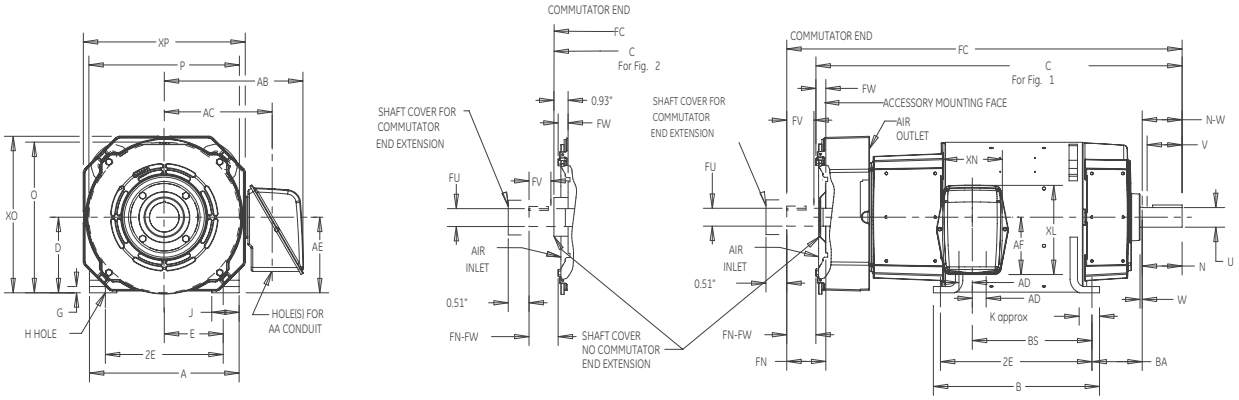
The standard single shaft machine has the commutator end bearing bracket and shaft prepared to accept accessories.

Commutator end shaft extension is furnished only when specifically ordered, and is prepared for accessory drive.

DC Motors – Kinamatic™

Type CD, Totally Enclosed Fan Cooled Frames 365AT to L409AT with Feet

Motor Dimensions (cont.)



Frame Size	See Fig. No.	Approx. Net Wt. (lbs) ◊	Approx. Wk2 of Arm. Lb. Ft²	Drive End Key			Commutator End Key			Dimensions in Inches										
				Width	Thick	Length ±.03	Width	Thick	Length ±.03	A Max	B Max	C	D(1)	E	2F	G	H	J	K	N
365AT	1	830	15.61	0.625	0.625	3.50	0.500	0.500	3.00	17.92	14.16	38.22	9.0	7.0	12.25	0.74	0.8125	3.26	2.31	4.92
366AT	1	940	18.27	0.625	0.625	3.50	0.500	0.500	3.00	17.92	15.90	40.42	9.0	7.0	14.00	0.74	0.8125	3.26	2.31	4.92
368AT	1	1100	22.21	0.625	0.625	3.50	0.500	0.500	3.00	17.92	19.90	43.42	9.0	7.0	18.00	0.74	0.8125	3.26	2.31	4.92
407AT	2	1380	35.47	0.625	0.625	4.00	0.625	0.625	3.50	20.00	20.16	44.90	10.0	8.0	18.00	0.86	0.9375	4.00	2.38	5.42
L407AT	2	1430	35.54	0.625	0.625	4.00	0.625	0.625	3.50	20.00	20.16	48.30	10.0	8.0	18.00	0.86	0.9375	4.00	2.38	5.42
409AT	2	1680	43.81	0.625	0.625	4.00	0.625	0.625	3.50	20.00	24.16	49.40	10.0	8.0	22.00	0.86	0.9375	4.00	2.38	5.42
L409AT	2	1730	43.88	0.625	0.625	4.00	0.625	0.625	3.50	20.00	24.16	52.80	10.0	8.0	22.00	0.86	0.9375	4.00	2.38	5.42

Frame Size	See Fig. No.	Dimensions Continued (For Conduit Box Dimensions, refer to publication GEP-387K, Page 124)																BS		
		O	P	U(2)	V(3)	W	N-W	BA	FC	FN	FU(2)	FV(3)	FW	FN-FW	XO	XP	AA = 3"	AA = 4"	AA = (2) 4"	AA = Blank
365AT	1	17.91	17.90	2.375	4.50	0.17	4.75	5.875	42.47	5.42	2.125	4.00	1.17	4.25	18.62	19.24	9.02	9.02	6.64	-
366AT	1	17.91	17.90	2.375	4.50	0.17	4.75	5.875	44.67	5.42	2.125	4.00	1.17	4.25	18.62	19.24	11.22	11.22	8.84	-
368AT	1	17.91	17.90	2.375	4.50	0.17	4.75	5.875	44.67	5.42	2.125	4.00	1.17	4.25	18.62	19.24	14.22	14.22	11.84	-
407AT	2	20.15	20.38	2.625	5.00	0.17	5.25	6.625	49.39	5.42	2.375	4.50	0.67	4.75	19.62	19.24	15.18	15.18	12.80	12.80
L407AT	2	20.15	20.38	2.625	5.00	0.17	5.25	6.625	52.79	5.42	2.375	4.50	0.67	4.75	19.62	19.24	15.18	15.18	12.80	12.80
409AT	2	20.15	20.38	2.625	5.00	0.17	5.25	6.625	53.89	5.42	2.375	4.50	0.67	4.75	19.62	19.24	19.68	19.68	17.30	17.30
L409AT	2	20.15	20.38	2.625	5.00	0.17	5.25	6.625	57.29	5.42	2.375	4.50	0.67	4.75	19.62	19.24	19.68	19.68	17.30	17.30

Frame Size	13.38 x 13.31 AA = Blank, Available Drill Space				
	AB	AE	AF	XL	XN
360AT	Not Available				
400AT	24.76	12.95	6.75	13.50	13.50

Frame Size	Dimensions in Inches																		
	AA = 3						AA = 4						AA = (2) 4						
	AB	AC	AE	AF	XL	XN	AB	AC	AE	AF	XL	XN	AB	AC	AD	AE	AF	XL	XN
360AT	16.08	12.33	9.00	6.44	10.12	7.00	17.82	13.20	9.00	8.50	13.50	8.62	18.72	14.97	3.00	9.00	6.75	13.50	13.50
400AT	17.47	13.72	12.92	6.44	10.12	7.00	19.22	14.60	12.95	8.50	13.50	8.62	20.12	16.37	3.00	12.95	6.75	13.50	13.50

Notes:

Machine can be used for wall or ceiling mounting.

1 Dimensions "D" will not be exceeded. When exact dimension is required, shims up to .03 inches may be necessary where dimension "D" is 8 inches or less. When dimension "D" is over 8 inches, shims up to .06 inch may be necessary.

2 Shaft diameters 1.5 inches and smaller will come within the limits of +0.0000 inch -0.0005 inch. Diameters larger than 1.5 inches will come within the limits of +0.0000 inch -0.0010 inch. Shaft runout on diameters 1.625 inches and smaller shall not exceed .002 inch indicator reading. Diameters larger than 1.625 inches shall not exceed .003 inch indicator reading.

3 "V" represents minimum length of shaft available for hubs.

◊ For shipping weight add 15% to net weight.

Conduit box will be assembled on the right hand side facing the commutator end for motors, and on the left hand side facing the commutator end for generators. Conduit box will be assembled on opposite side of frame, if so specified. Conduit box may be oriented to accommodate customer's application. Dimensions pertaining to conduit boxes vary according to rating. Contact your dealer for dimensions.

The standard single shaft machine has the commutator end bearing bracket and shaft prepared to accept accessories.

Commutator end shaft extension is furnished only when specifically ordered, and is prepared for accessory drive.

DC Motors – Kinamatic™

Kits and Accessories

Type CD

Blower Kits

Blower kits are designed for standard mounting on the motor commutator end and for addition only to Dripproof Fully Guarded (DPFG) or Dripproof Fully Guarded - Separately Ventilated (DPFG-BV) motors. Blower motors are 230/460 Volts AC, 3 phase, 60 Hertz. To properly mount blower kits on CD180AT frames, drilling and tapping three holes is required. For other applications, refer to factory.

Blower with Filter

Cat. No.	Frame Size	
A687	CDL182AT-CD188AT	GO-2KITS
A688	CD218AT-CD2110AT	GO-2KITS
A689	CD258AT-CD259AT	GO-2KITS
A690	CD287AT-CD288AT	GO-2KITS
A691	CD327AT-CD328AT	GO-2KITS
A692	CD365AT-CD368AT	GO-2KITS
A693	CD407AT-CD409AT	GO-2KITS
A694	CDL407AT-CDL409AT	GO-2KITS
A695	CD504AT-CD5010AY	GO-2KITS

C-Face Endshield Kits

C-Face endshield kits are designed for mounting on the Fully Guarded or Totally Enclosed Non-Ventilated motors, but requires machine disassembly by a qualified service facility.

Cat. No.	Frame Size	
A670	CDL182AT-CD189AT (DP)	GO-2KITS
A673	CDL182AT-CD189AT (TEFC)	GO-2KITS
A671	CD218AT-CD2110AT	GO-2KITS
A672	CD258AT-CD259AT	GO-2KITS
A674	CD287AT-CD288AT	GO-2KITS
A676	CD327AT-CD328AT	GO-2KITS

Lexan® Covers

Two transparent covers are required to replace metal covers on the brush openings at the commutator. Each kit includes one cover.

Cat. No.	Frame Size	
A677	CD218AT-CD2110AT	GO-2KITS
A678	CD258AT-CD259AT	GO-2KITS
A680	CD287AT-CD288AT	GO-2KITS
A682	CD327AT-CD329AT	GO-2KITS
A683	CD365AT-CD409AT	GO-2KITS
A684	CDL407AT-CDL409AT	GO-2KITS
A685	CD504AT-CD5010AY	GO-2KITS

DC Motors – Kinamatic™

Kits and Accessories (cont.)

Tachometers

The Type AN enclosure provides a compact construction for medium accuracy speed-indicating or speed-regulating application. The AN series tachometers can be furnished with either AC or digital output signal for speed regulation. For information on Type PY or Type BC tachometers, refer to the Tachometer Generator Section.

AN Series

Cat. No.	Frame Size	
A647	CD182AT-CD328AT	GO-2KITS
A648	CD365AT-CD368AT	GO-2KITS
A649	CD407AT-CD409AT	GO-2KITS
A650	CD504AT-CD5010AY	GO-2KITS

Tachometer Mounting Kits

Tachometer mounting kits are design for mounting on the accessory commutator end shaft extension of Fully Guarded or Totally Enclosed Kinamatic motors, with the exception of TEFC machines. Refer to factory for TEFC motors. This feature is optional on all CD180AT frames. An accessory commutator end shaft extension is supplied on all CD210AT-CD500AT frame motors and will accept a tachometer kit only if the shaft extension is currently not is use. Note: Type BC and Type PY tachometer must be ordered independently of the tachometer mounting kit.

Type BC Tachometer Mounting Kit

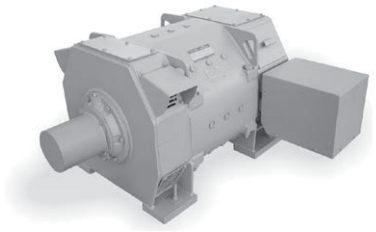
Cat. No.	Frame Size	
A641	CD182AT-CD328AT	GO-2KITS
A642	CD365AT-CD368AT	GO-2KITS
A643	CD407AT-CD5010AY	GO-2KITS

Type PY Tachometer Mounting Kit

Cat. No.	Frame Size	
A644	CD182AT-CD328AT	GO-2KITS
A645	CD365AT-CD368AT	GO-2KITS
A646	CD407AT-CD409AT	GO-2KITS
A686	CD504AT-CD5010AY	GO-2KITS

Mill Duty Motors
Direct Current MD800

Standard Features



Introduction

Auxiliary mill motors are specifically designed for mill, crane and hoist service. They may be used advantageously for any application which requires a high ratio of peak to average load torques or where a motor is required to accelerate, decelerate or reverse rapidly under conditions of severe duty-cycle operation. Armored motors are designed to meet the standards established by the Association of Iron and Steel Technology (AIST).

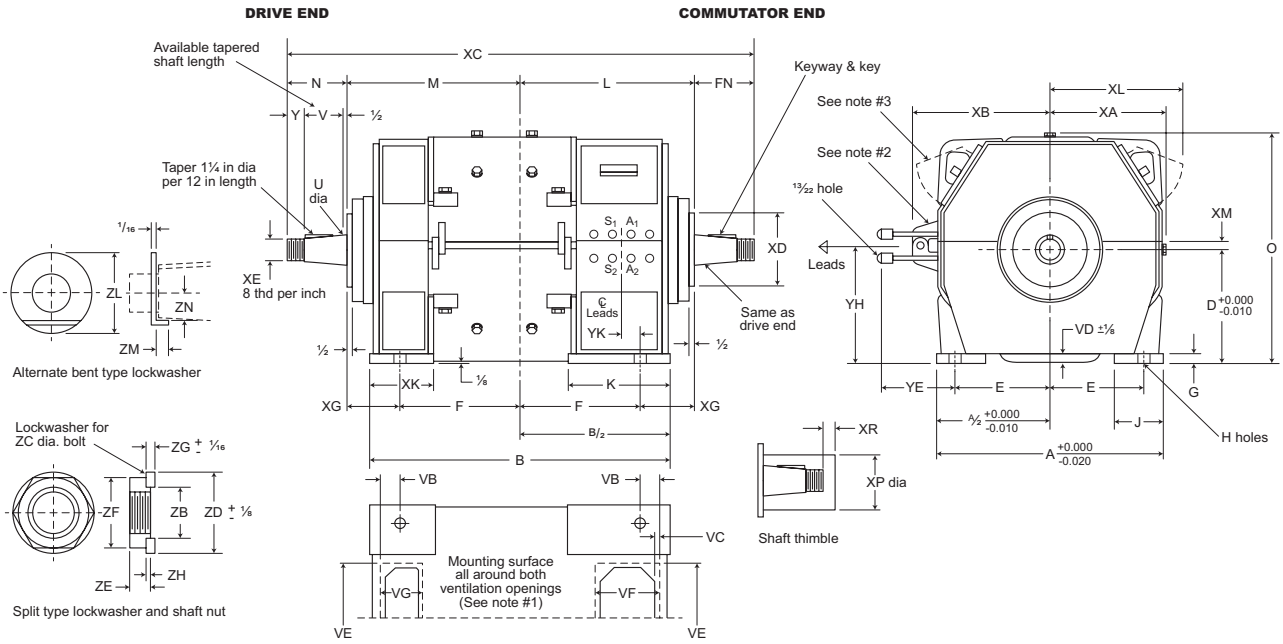
HP Range	5 - 250
Voltage	230 Volt DC
Altitude	3300 ft
Ambient	40°C
Bearing Type	Single-width solid cylindrical roller bearing
Enclosures	Totally Enclosed and Forced Ventilated
Frames	Horizontally split steel frame with lifting lugs
Frame Size	MD802 through MD818
Insulation Class	H
Leads	Exit frame F2 configuration (conduit box not standard)
Shaft	Tapered and equal on DE and CE and replaceable without disturbing the windings
Speed	Various
Temperature Rise	75°C rise by thermometer or 110°C rise by resistance
Time Ratings	Continuous, 30 minutes or 60 minutes
Warranty	24 months from date of installation or 30 months from date of manufacture; whichever occurs first
Winding	Series, Shunt, and Compound

Standard Type Product Offering

Frame Size	60 min. 75°C Rise Totally Enclosed, or Continuous, 75°C Rise Force-Ventilated				30 min. 75°C Rise Totally Enclosed			Continuous Duty Cycle, 30% Time On, 75°C Rise, Totally Enclosed					
		Full-Load Speed RPM (Approx.)				Full-Load Speed RPM (Approx.)		Full-Load Speed RPM (Approx.)					
								Series		Compound		Shunt	
	HP	Series	Compound or Shunt	Adjustable Speed	HP	Series	Compound	HP	RPM	HP	RPM	HP	RPM
802A	5	900	1025	1025/2050	6.5	750	925	5.5	840	5	1080	5	1130
802B	7.5	800	900	900/1800	10	675	775	8	780	7.5	950	7.5	1000
802C	10	800	900	900/1800	13.5	675	775	10	800	9.5	940	9	1000
803	15	725	800	800/2000	19	620	725	15	725	14.5	840	14	880
804	20	650	725	725/1800	26	580	650	20	650	18.5	775	17	800
806	30	575	650	650/1950	39	500	600	30	575	28.5	690	25	715
808	50	525	575	575/1725	65	450	525	40	570	37.5	625	35	630
810	70	500	550	550/1650	90	440	500	60	550	52.5	615	45	600
812	100	475	515	515/1300	135	420	475	85	510	75	580	60	565
814	150	460	500	500/1250	200	400	460	115	515	110	565	85	560
816	200	450	480	480/1200	265	400	450	150	500	140	540	110	535
818	250	410	435	435/1100	325	360	400	185	485	165	490	130	470

Mill Duty Motors
Direct Current MD800

Dimensions



Frame	Approx. Net Wgt in lbs.	Dimensions in Inches																			
		A	B	D	E	F	G	H	J	K	LM	O	XA	XB	XC	XD	XG	XK	XL	XM	XP
802	600	15.00	20.50	7.63	6.25	8.25	0.75	0.78	3.13	8.63	12.00	15.56	8.19	9.88	32.88	4.50	3.75	5.13	9.75	0.63	2.75
803	770	17.00	23.50	8.50	7.00	9.00	0.88	0.91	3.63	9.13	13.50	17.31	9.00	10.69	37.00	5.50	4.50	5.88	10.63	0.63	3.63
804	960	18.00	25.50	9.00	7.50	9.50	0.88	0.91	4.00	9.75	14.50	18.31	9.31	11.00	39.00	5.50	5.00	5.75	10.88	0.75	3.63
806	1300	20.00	27.50	10.00	8.25	10.50	1.00	1.03	4.25	10.00	15.50	20.31	10.31	12.25	42.25	6.25	5.00	6.75	12.00	0.75	4.25
808	1790	22.75	31.25	11.25	9.38	12.38	1.13	1.19	4.75	11.75	17.50	22.94	11.69	13.50	42.50	7.25	5.13	7.00	13.50	0.88	4.25
810	2450	24.50	32.50	12.25	10.25	13.00	1.13	1.19	5.25	11.00	18.75	24.94	12.69	14.50	50.25	8.00	5.75	7.00	14.50	1.00	6.06
812	3280	27.00	36.00	13.38	11.25	14.50	1.25	1.31	5.75	11.00	20.50	27.19	13.81	15.63	55.00	8.75	6.25	8.25	15.75	1.00	6.06
814	4500	30.00	41.50	14.75	12.50	16.00	1.50	1.56	6.25	13.50	23.25	29.94	15.19	-	60.75	10.00	7.25	8.75	17.25	1.13	7.69
816	5780	32.50	46.75	16.00	13.50	17.50	1.50	1.56	7.25	17.50	26.00	32.44	16.44	-	67.50	10.00	8.50	9.75	19.50	1.25	7.69
818	7500	36.00	49.75	17.75	15.00	19.50	1.75	1.81	7.75	17.75	17.50	35.94	18.19	-	70.63	10.00	8.00	11.00	21.50	1.38	7.69

Frame	Dimensions in Inches																									
	Shaft					Keyway		Key	Nut and Lockwasher										Vent. Duct Flange Surface						Motor Leads		
	N FN	U	V	Y	XE	W	D	L	ZB	ZC	ZD	ZE	ZF	ZG	ZH	ZL	ZM	ZN	VB	VC	VD	VE	VF	VG	YE	YH	YK
802	4.44	1.75	2.75	1.19	1.00	0.50	0.25	2.62	1.38	1.50	2.38	0.88	2.00	0.25	0.19	2.50	0.25	1.00	0.88	0.38	0.50	7.25	4.75	2.19	7.0	8.62	3.0
803	5.00	2.00	3.25	1.25	1.25	0.50	0.25	3.12	1.50	1.50	2.38	0.94	2.25	0.25	0.19	2.88	0.31	1.33	1.75	0.50	0.50	8.50	5.00	3.25	7.0	9.50	3.0
804	5.00	2.00	3.25	1.25	1.25	0.50	0.25	3.12	1.50	1.50	2.38	0.94	2.25	0.25	0.19	2.88	0.31	1.12	2.25	0.50	0.62	9.00	5.50	2.75	7.0	10.00	3.0
806	5.62	2.50	3.75	1.38	1.50	0.50	0.25	3.75	2.00	2.00	2.88	1.06	2.75	0.38	0.31	3.25	0.38	1.25	2.12	0.50	0.75	10.25	6.00	3.38	7.0	11.00	3.0
808	6.25	3.00	4.25	1.50	2.00	0.75	0.25	4.12	2.50	2.50	3.50	1.19	3.50	0.44	0.38	4.31	0.66	1.50	2.00	0.50	0.88	11.50	6.50	3.50	10.0	12.50	3.0
810	6.38	3.25	4.25	1.62	2.25	0.75	0.25	4.12	2.75	2.75	3.75	1.31	4.00	0.50	0.44	4.75	0.75	1.62	2.12	0.50	0.88	12.00	7.00	3.62	10.0	13.50	3.0
812	7.00	3.62	4.75	1.75	2.50	0.75	0.25	4.62	3.00	3.00	4.00	1.44	4.25	0.50	0.44	5.00	0.62	1.88	2.50	0.62	1.00	13.75	8.25	4.88	10.0	14.62	3.0
814	7.12	4.25	4.75	1.88	3.00	1.00	0.38	4.62	3.50	3.50	5.00	1.56	4.75	0.38	0.31	5.88	0.72	2.22	3.38	0.62	1.25	15.25	9.25	5.50	12.0	16.25	3.0
816	7.75	4.62	5.25	2.00	3.25	1.25	0.38	5.12	4.00	4.00	6.00	1.69	5.38	0.38	0.31	6.50	0.62	2.62	2.50	1.00	1.12	16.00	11.00	6.62	12.0	17.50	4.5
818	7.81	5.00	5.75	1.56	3.50	1.25	0.50	5.62	4.00	4.00	6.00	1.25	5.75	0.38	0.31	6.75	0.75	2.62	3.88	1.00	1.38	18.00	12.00	7.12	12.0	19.25	4.5

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- Highly experienced account managers and seasoned application engineers.
- Extensive inventory and distribution network.

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I. ELECTRICAL DESIGN

VOLTAGE

DEFINITION

The motor nameplate voltage is determined by the available power supply, which must be known in order to properly select a motor for a given application. The nameplate voltage will normally be less than the nominal distribution system voltage.

The distribution voltage is the same as the supply transformer voltage rating; the utilization (motor nameplate) voltage is set at a slightly lower level to allow for a voltage drop in the system between the transformer and the motor leads.

Some specification still call for 220, 440 or 550 volt motors which were the long accepted standards. However, modern distribution systems have transformers located adjacent to secondary unit substations or load centers, plant wide power factor correction and shorter power line runs. The result is a stiffer distribution system which delivers higher voltage at the motor. The following motor nameplate voltages provide the best match to distribution system voltages and meet current motor design practices.

Table 1: Standard 60 HZ Nameplate Voltages

Nominal Distribution System Voltage	Motor Nameplate Voltage	
Polyphase 60 HZ	Below 125 Hp	125 Hp & Up
208	200	-
240	230	-
480	460	460
600	575	575
2400	2300	2300
4160	4000	4000
	-	6600
Single-phase 60 HZ		
120	115	-
208	200	-
240	230	-

NOTE: Distribution system voltages vary from country to country; therefore, motor nameplate voltage should be selected for the country in which it will be operated. Though, generally it is observed of nominal voltages of 230V/400V or 400V/690V. Additionally references for 'System voltages' can be found in IEEE 141 and IEC 60038.

SPECIAL VOLTAGES

Special motor designs are required for nameplate voltages other than those listed in Tables 1 and 2. Motors greater than 100 horsepower rated less than 34 volts will not be furnished without approval of the Company. Motors with nameplate voltages different than those listed in Tables 1 or 2.

Table 2: Standard 50 HZ Nameplate Voltages

Nominal Distribution System Voltage	Motor Nameplate Voltage	
Polyphase 50 HZ	Below 125 Hp	125 Hp & Up
See Note	200	-
	220	-
	380	380
	400	400
	415	415
	550	550
	690	690
	-	3000
	-	6600
Single-phase 60 HZ	-	3300
120	110	-
208	200	-
240	220	-

DUAL VOLTAGE MOTORS

Polyphase and single-phase motors may be furnished as dual voltage ratings under the following conditions:

1. Both voltages are standard for the particular rating as listed in Tables 1 and 2.
2. The two voltages are in a ratio of either 1:2 or 1:√3 (e.g. 230/460, 60 HZ; 2300/4000, 60 HZ; or 220/380, 50 HZ).
3. Single-phase voltage ratios are 1:2 only.

VOLTAGE AND FREQUENCY VARIATION

All motors are designed to operate successfully with limited voltage and frequency variations. However, voltage variation with rated frequency must be limited to ±10% and frequency variation with rated voltage must be limited to ±5%. The combined variation of voltage and frequency must be limited to 10% (subject to the sum of absolute value with frequency variation not exceeding ±5% of rated value). Variations are expressed as deviation form motor nameplate values, not necessarily system nominal values.The allowable ±10% voltage variation is based upon the assumption that horsepower will not exceed nameplate rating and that motor temperature may increase. For instance, a 230 volt motor operating at 207 volts (90% of rated) loses any service factor indicated on the nameplate, and could run hotter than at rated voltage.

The following conditions are likely to occur with variations in voltage:

A. An increase or decrease in voltage may result in increased heating at rated horsepower load. Under extended operation this may accelerate insulation deterioration and shorten motor insulation life.

B. An increase in voltage will usually result in a noticeable decrease in power factor. Conversely, a decrease in voltage will result in an increase in power factor.

C. Locked-rotor and breakdown torque will be proportional to the square of the voltage. Therefore, a decrease in voltage will result in a decrease in available torque.

D. An increase of 10% in voltage will result in a reduction of slip for approximately 17%. A voltage reduction of 10% would increase slip by about 21%.

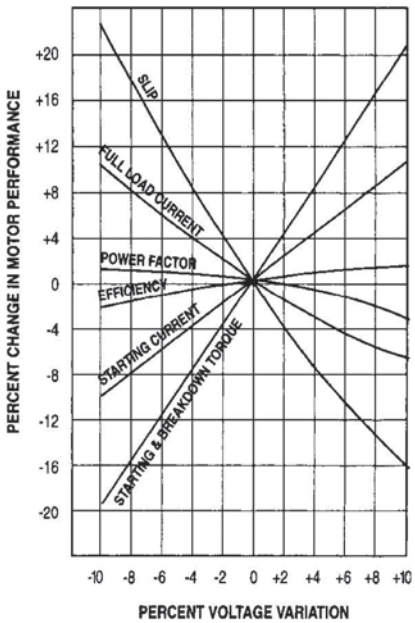


Figure 1: Performance variations with respect to Voltage Variation.

The following conditions are likely to occur with variations in frequency:

A. Frequency greater than rated frequency normally improves power factor but decreases locked-rotor and maximum torque. This condition also increases speed, and therefore, friction and windage losses.

B. Conversely, a decrease in frequency will usually lower power factor and speed while increasing locked-rotor maximum torque and locked-rotor current.

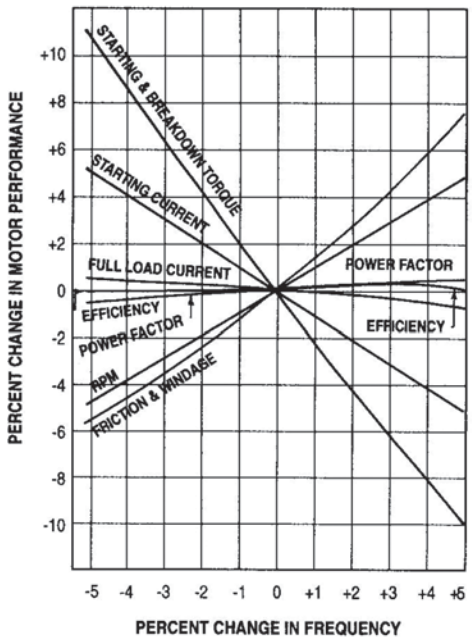


Figure 2: Performance variations with respect to Frequency Variation

VOLTAGE UNBALANCE

Unbalanced line voltages applied to a polyphase motor result in unbalanced currents in the stator windings. Even a small percentage of current unbalance, thus increasing temperature rise and possibly resulting in nuisance tripping.

Voltages should be as evenly balanced as can be read on a voltmeter. If voltages are unbalanced, the rated horsepower of the motor should be derated, based upon the percent unbalance, as shown in the following graph

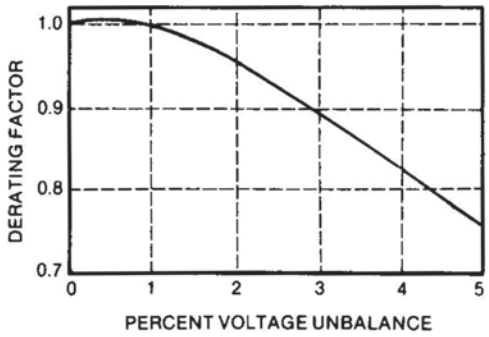


Figure 3: Voltage Unbalance is calculated as follows:

$$\text{Percent Unbalance} = 100 \times \frac{\text{Maximum Voltage Deviation From Average Voltage}}{\text{Average Voltage}}$$

For instance, a 100 horsepower, three-phase motor operating with voltages of 598, 575 and 552 applied at the motor terminals,
Average Voltage = (598+575+552)/3 = 575V
Voltage deviation from average Voltage = Absolute (575-598) = 23V; Absolute (575-552) = 23V; Absolute (575-575) = 0V
Maximum deviation from average voltage = 23V
%Unbalance = 100*23/575 = 4%

From Figure 3, the rated output of 100 horsepower should be derated to approximately 82 Hp to reduce the possibility of damage to the motor. Motor operation above 5% voltage unbalance is not recommended.

Unbalance voltages will produce the following effects on performance characteristics:

Torques:	Unbalanced voltage results in reduced locked-rotor and breakdown torques for the application.
Full-Load Speed:	Unbalanced voltage results in a slight reduction of full-load speed.
Current:	Locked-rotor current will be unbalanced to the same degree that voltages are unbalanced but locked-rotor KVA will increase only slightly. Full-load current at unbalanced voltage will be unbalanced in the order of six to ten times the voltage unbalance.
Temperature Rise:	A 3.5% voltage unbalance will cause an approximate 25% increase in temperature rise.

LOW STARTING VOLTAGE

Large motors may experience a considerable voltage drop at the motor terminals when started due to large inrush current values. Motors can be designed to compensate for the drop in voltage. For example, motors in frames 143-5013 can be supplied for operation under low starting voltage conditions down to 65% of nameplate rated voltage. The inertia referred to the motor shaft, the type of load (constant or variable torque), and the expected voltage drop must be provided to allow evaluation of the application for each rating involved. In any case, motors designed for low starting voltage may have higher than standard inrush current when started on full rated voltage.

FREQUENCY

DEFINITION

Frequency can be defined as the number of complete alternations-per-second of an alternating current

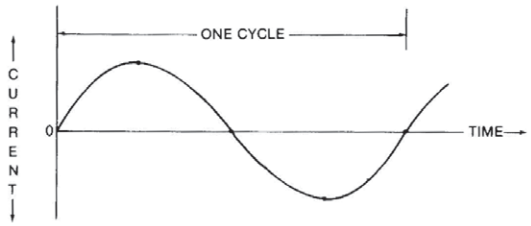


Figure 4

As shown in Figure 4 above, current is said to have been through one complete cycle when it has gone from zero to maximum, to minimum, and back to zero again. Frequency is the number of these complete cycles over the passage of time and is usually expressed as HZ: one HZ equals one cycle per second (cps). Predominant power system frequency in North America is 60 HZ.

FREQUENCY STANDARDS

The predominant power system frequency in the United States is 60 HZ. However, 50 HZ systems are common in other countries. Other systems such as 40 HZ and 25 HZ are isolated and relatively few in number.

50 HZ OPERATION OF 60 HZ MOTORS

General Electric standard motors rated at 60 HZ may be successfully operated at 50 HZ at reduced voltage and horsepower as shown in the following table:

Table 3

Motor Rated 60 HZ Voltage	50 HZ Operational Voltage Rating (±5%)		
230	190	200	208
460	380	400	415
575	475	500	-
De-rate factor	.85	.90	1.00

- Rated Hp at 50 HZ = Nameplate Hp x De-rate Factor
- Allowable voltage variation at de-rated Hp = ±5%
- Select motor overload protection for 60 HZ amps and 1.0 Service Factor
- Motor speed = 5/6 nameplate rated speed
- Service Factor = 1.0

60 HZ motors intended for use as shown above should be ordered as 60 HZ motors with no reference to 50 HZ operation.

DUAL FREQUENCY

Motors that require 50 HZ and 60 HZ operation of the same motor are non-NEMA defined motors and will be nameplate as such. When this is a motor requirement, it must be specified with the order.

Some of our stock motors are nameplated 50/60 HZ and others can be re-rated; refer to technical support or EliteNet.

VARIABLE FREQUENCY OPERATION

Motors are available for use on variable frequency inverters of various types:

1. VVI is a square wave inverter in which voltage and frequency vary in proportion (constant volts per HZ).
2. PWM is a pulse width modulated inverter and the same as the VVI type except pulses are varied in time to simulate a sine wave.
   - 2a. IGBT is a pulse width modulated inverter using a bipolar transistor for higher switching speeds. This technology provinces a cleaner resolved sine wave on a carrier frequency above the audible range.
   - 2b. Vector control
3. CCI is a constant current inverter, which utilizes a square wave current supply as opposed to voltage.

When applying a motor for use with a variable frequency drive, see section on special applications (For more details, refer to page TR.50).

POLYPHASE OR SINGLE-PHASE POWER

DEFINITION

A power system can be either single-phase or polyphase. Figure 4 illustrates single-phase power, which is most commonly found in homes, rural areas and in small commercial establishments.

A polyphase power system consists of two or more alternating currents of equal frequency and amplitude but offset from each other by a phase angle. Figure 5 illustrates a three phase power system having phases A, B, and C. Each phase is offset by 120 degrees, 360 degrees being the span of one complete cycle.

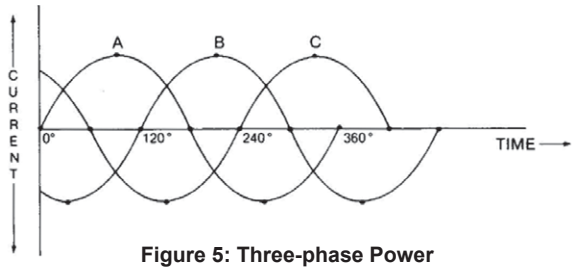


Figure 5: Three-phase Power

For motors, an advantage of three-phase power is simpler construction which requires less maintenance. Also, a more powerful machine can be built into a smaller frame and will generally operate at a higher efficiency than single-phase motors of the same rating.

MOTOR OUTPUT RATING

SPEED

The speed at which an induction motor operates is dependent upon the input power frequency and the number of electromagnetic poles for which the motor is wound. The higher the frequency, the faster the motor runs. The more poles the motor has, the slower it runs. The speed of the rotating magnetic field in the stator is called synchronous speed. To determine the synchronous speed of an induction motor, the following equation is used:

$$\text{Synchronous Speed (RPM)} = \frac{60 \times 2 \times \text{Frequency}}{\text{Number of Poles}}$$

Actual full-load speed (the speed at which an induction motor will operate at nameplate rated load) will be less than synchronous speed. The difference between synchronous speed and full-load speed is called slip. Percent slip is defined as follows:

$$\text{Percent slip} = \frac{\text{Synchronous Speed - Full Load Speed}}{\text{Synchronous Speed}} (\times 100)$$

Induction motors are built having rated slip ranging from less than 5% to as much as 20%. A motor with a slip of less than 5% is called a normal slip motor. Motors with a slip of 5% or more are used for applications requiring high starting torque (conveyor) and /or higher than normal slip (punch press) where, as the motor slows down, increased torque allows for flywheel energy release.

TORQUE AND HORSEPOWER

Torque and horsepower are two key motor characteristics that determine the size of the motor for an application. The difference between the two can be explained using a simple illustration of a shaft and wrench.

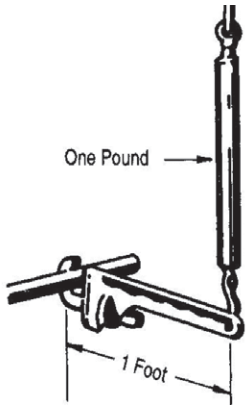


Figure 6

Torque is merely a turning effort or force acting through a radius. In Figure 6 , it takes one pound at the end of the one foot wrench to turn the shaft at a steady rate. Therefore, the torque required is one pound times one foot, or one pound-foot. If the wrench were turned twice as fast, the torque required would remain the same, provided it is turned at a steady rate.

Horsepower, on the other hand, takes into account how fast the shaft is turned. Turning the shaft rapidly require more horsepower than turning it slowly. Thus, horsepower is a measure of the rate at which work is done. By definition, the relationship between torque and power is as follows:

1 Horsepower = 33,000 lb.-ft./minute

or

1 Horsepower = 0.746 kilowatt

1 kilowatt = 1,000 N-m/Sec

In the above example, the one pound force moves a distance of 1 foot x 2π x 1 pound, or 6.28 feet per revolution. To produce one horsepower, the shaft would have to be turned at a rate of:

$$\frac{1\ \text{Hp} \times 33{,}000\ \text{lb-ft/min/Hp}}{1\ \text{lb} \times 2} = 5{,}252\ \text{RPM}$$

From the above, an equation is derived for determining horsepower output from speed and torque in lb-ft.

$$\text{Hp} = \frac{\text{RPM} \times 2\pi \times \text{Torque}}{33{,}000} \quad \text{or Hp} = \frac{\text{RPM} \times \text{Torque}}{5{,}252}$$

Or when output is in kW and Torque is in N-m;

$$\text{kW} = \frac{\text{RPM} \times 2\pi \times \text{Torque}}{60{,}000} \quad \text{or kW} = \frac{\text{RPM} \times \text{Torque}}{9{,}549}$$

From this relationship:

$$\text{Full-Load torque in lb-ft} = \frac{\text{Hp} \times 5{,}252}{\text{Full load RPM}}$$

OR

$$\text{Full-Load torque in N-m} = \frac{\text{kW} \times 9{,}549}{\text{Full load RPM}}$$

The following graph illustrates a typical speed torque curve for a NEMA design B induction motor. An understanding of several points on this curve will aid in properly applying motors.

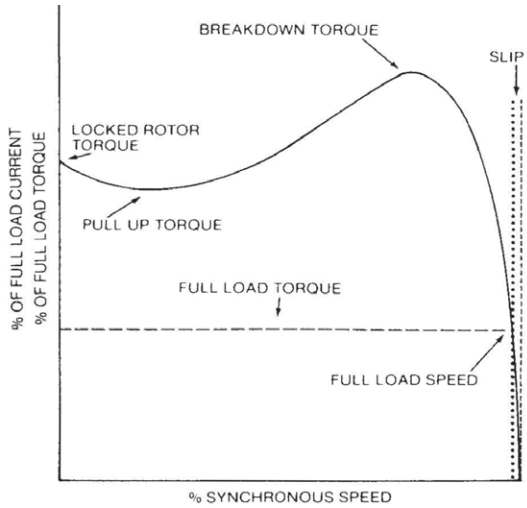


Figure 7: Speed Torque Curve

LOCKED-ROTOR TORQUE

Locked-rotor torque ('Breakaway Torque' or 'Starting Torque') is the torque which the motor will develop at rest (for all angular positions of the rotor) with rated voltage at rated frequency applied. It is also sometimes known as starting torque and is usually expressed as a percentage of full-load torque.

PULL-UP TORQUE

Pull-up (pull-in) torque is the minimum torque developed during the period of acceleration from locked-rotor to the speed at which breakdown torque occurs. For motors which do not have a definite breakdown torque (such as NEMA design D) pull-up torque is the minimum torque developed up to rated full-load speed. It is usually expressed as a percentage of full-load torque.

NOTE: Pull-in Torque and pull-out Torque are terms used for synchronous motors.

BREAKDOWN TORQUE

Breakdown (Maximum or Pull-out) torque is the maximum torque the motor will develop with rated voltage applied at rated frequency without an abrupt drop in speed. Breakdown torque is usually expressed as a percentage of full-load torque.

FULL-LOAD TORQUE

Full-load torque is the torque necessary to produce rated horsepower at full-load speed. In pound-feet, it is equal to the rated horsepower times 5252 divided by the full-load speed in RPM.

MOTOR CURRENT

In addition to the relationship between speed and torque, the relationship of motor current to these two values is an important application consideration. The speed/torque curve is repeated below with the current curve added to demonstrate a typical relationship.

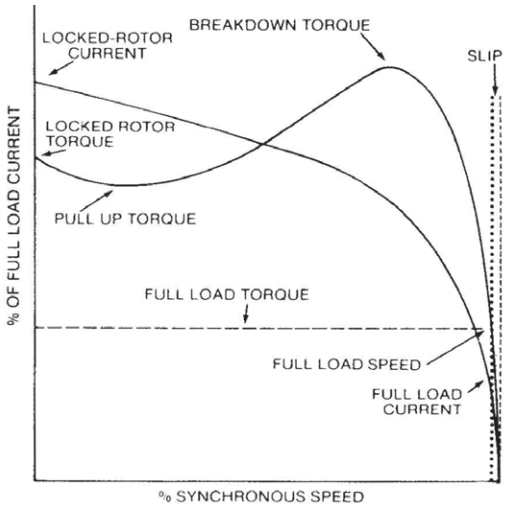


Figure 8: Speed, Torque, Current Curve

Two important points on this current curve need to be examined:

FULL-LOAD CURRENT

The full-load current of an induction motor is the steady-state current taken from the power line when the motor is operating at the full-load torque with rated voltage and rated frequency applied.

LOCKED-ROTOR CURRENT

Locked-rotor current is the steady-state current of a motor with the rotor locked and with rated voltage applied at rated frequency. NEMA has designated a set of code letters to define locked-rotor kilovolt-amperes-per-horsepower. This code letter appears on the nameplate of all AC squirrel-cage induction motors. KVA per horsepower is calculated as follows:

For three-phase motors:

$$\text{KVA/Hp} = \frac{\sqrt{3} \times \text{LR current (in amperes)} \times \text{volts}}{1{,}000 \times \text{Hp}}$$

For single-phase motors:

$$\text{KVA/Hp} = \frac{\text{LR current (in amperes)} \times \text{volts}}{1{,}000 \times \text{Hp}}$$

Table 4: Locked-Rotor Current Code Letters

Letter Designation	KVA per Hp*
A	0-3.15
B	3.15-3.55
C	3.55-4.0
D	4.0-4.5
E	4.5-5.0
F	5.0-5.6
G	5.6-6.3
H	6.3-7.1
J	7.1-8.0
K	8.0-9.0
L	9.0-10.0
M	10.0-11.2
N	11.2-12.5
P	12.5-14.0
R	14.0-16.0
S	16.0-18.0
T	18.0-20.0
U	20.0-22.4
V	22.4 and up

*The locked-rotor kilovolt-amperes-per-horsepower range includes the lower figure up to, but not including, the higher figure. For example, 3.14 is letter “A” and 3.15 is letter “B”.

By manipulating the preceding equation for KVA/Hp for three-phase motors the following equation can be derived for calculating locked-rotor current:

$$\text{LRA} = \frac{1{,}000 \times \text{Hp} \times \text{Locked-Rotor KVA/Hp}}{\sqrt{3} \times \text{Volts}}$$

This equation can then be used to determine approximate starting current of any particular motor. For instance, the approximate starting current for a 7.5 Hp, 230 volt motor with a locked-rotor KVA code letter G would be:

$$\text{LRA} = \frac{1{,}000 \times 7.5 \times 6.0}{\sqrt{3} \times 230}$$

Operating a motor in a locked-rotor condition in excess of 20 seconds can result in insulation failure due to the excessive heat generated in the stator. Figure 9 illustrates the maximum time a motor may be operated at locked-rotor without injurious heating. This graph assumes a NEMA design B motor with a class B or F temperature rise.

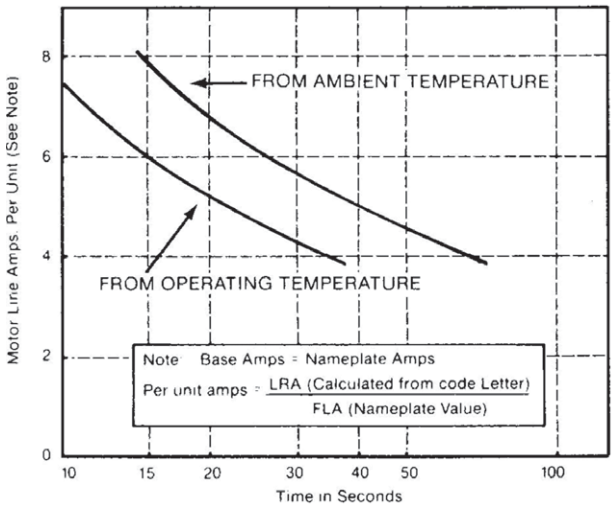


Figure 9: Line Current vs. Safe Stall Time for Standard Induction Motors

Motor protection, either inherent or at the motor control should be selected to limit stall time of the motor.

POLYPHASE MOTORS, 1-500 Hp

NEMA has designated several specific types of motors, each type having unique speed/torque relationships. These designs are described below along with some typical applications for each. Following these descriptions is a summary of performance characteristics.

NEMA DESIGN A & B [1-200 Hp (250 Hp-500 Hp, for 2 & 4 Pole only)]

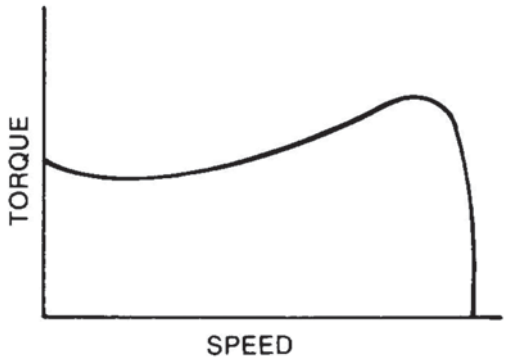


Figure 10: Typical NEMA Design A and B Speed/Torque Curve

GE Types:	K, KS
Starting Current:	Design A - High to Medium (not defined by NEMA) Design B - Low
Starting Torque:	Normal
Breakdown Torque:	Normal
Full-Load Slip:	Low (less than 5%)
Applications:	Fans, blowers, pumps, machine tools, or other uses with low starting torque requirements and essentially constant load.

NEMA DESIGN C (1-200 Hp)

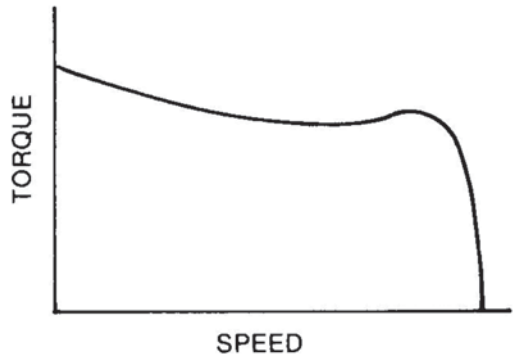


Figure 11: Typical NEMA Design C Speed/Torque Curve

GE Types:	KG, KGS
Starting Current:	Low
Starting Torque:	High
Breakdown Torque:	Normal
Full-Load Slip:	Low (less than 5%)
Applications:	Hard-to-start loads such as plunger pumps, conveyors and compressors.

NEMA DESIGN D (1-150 Hp)

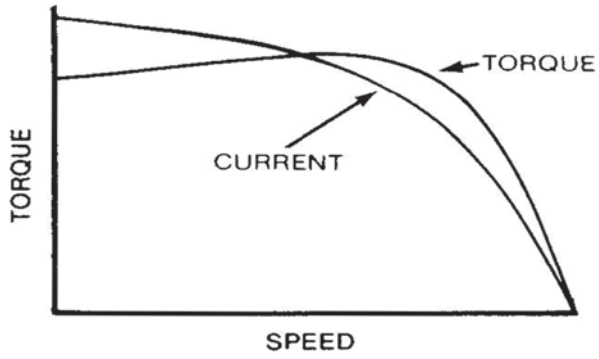


Figure 12: Typical NEMA Design D Speed/Torque Curve

GE Types:	KR
Starting Current:	Low
Starting Torque:	Very High
Breakdown Torque:	Not Applicable
Full-Load Slip:	High (5-8%; 8-13%)
Applications:	The combination of high starting torque and high slip make Type KR motors ideal for very high inertia loads and/or for considerable variations in load; e.g., punch presses, shears, cranes, hoists and elevators.

The following tables compare NEMA Polyphase design for several performance criteria

Table 5: Comparison of Polyphase Designs

NEMA Design	Starting Current	Locked-Rotor Torque	Breakdown Torque	% Slip	Applications
A	High to medium	Normal	Normal	Max 5%	Broad applications including fans, blowers, pumps, machined tools
B	Low	Normal	Normal	Max 5%	Normal Starting torque for fans, blowers, rotary pumps, unloaded compressors, some conveyors, metal cutting machine tools, misc machinery. Constant load speed.
C	Low	High	Normal	Max 5%	High inertia starts such as large centrifugal blowers, flywheels and crusher drums. Loaded starts such as piston pumps, compressors and conveyors. Constant load speed.
D	Low	Very High	N/A	N/A	Very high inertia and loaded starts. Choice of slip to match load.
				5-8%	1) Punch presses, shears and forming machine tools.
				8-13%	2) Cranes, hoists, elevators and oil well pumping jacks.

LOCKED ROTOR TORQUE

Table 6: Minimum Locked Rotor Torque - NEMA, MG-1, Part 12 (% Full-Load Torque)

Hp	Design A and B (ref. NEMA Table 12-2)							Design C (ref. NEMA Table 12-3)			Design D		
RPM @ 60 HZ	3600	1800	1200	900	720	600	514	1800	1200	900	1800	1200	900
RPM @ 50 HZ	3000	1500	1000	750	-	-	-	1500	1000	750	1500	1000	750
1	-	275	170	135	135	115	110	285	255	225	275	275	275
1.5	175	250	165	130	130	115	110	285	250	225	275	275	275
2	170	235	160	130	125	115	110	285	250	225	275	275	275
3	160	215	155	130	125	115	110	270	250	225	275	275	275
5	150	185	150	130	125	115	110	271	250	225	275	275	275
7.5	140	175	150	130	125	115	110	272	250	225	275	275	275
10	135	165	150	125	120	115	110	273	250	225	275	275	275
15	130	160	140	125	120	115	110	274	250	225	275	275	275
20	130	150	135	125	120	115	110	200	200	200	275	275	275
25	130	150	135	125	120	115	110	200	200	200	275	275	275
30	130	150	135	125	120	115	110	200	200	200	275	275	275
40	125	140	135	125	120	115	110	200	200	200	275	275	275
50	120	140	135	125	120	115	110	200	200	200	275	275	275
60	120	140	135	125	120	115	110	200	200	200	275	275	275
75	105	140	135	125	120	115	110	200	200	200	275	275	275
100	105	125	125	125	120	115	110	200	200	200	275	275	275
125	100	110	125	120	115	115	110	200	200	200	275	275	275
150	100	110	120	120	115	115	-	200	200	200	275	275	275
200	100	100	120	120	115	-	-	200	200	200	-	-	-
250	70	80	100	100	-	-	-	-	-	-	-	-	-
300-350	70	80	100	-	-	-	-	-	-	-	-	-	-
400-500	70	80	-	-	-	-	-	-	-	-	-	-	-

PULL-UP TORQUE

The pull-up torque for NEMA design A, B and C motors are listed in Table 7 with rated voltage and frequency applied, and torques will not be less than the following:

Table 7: Minimum Pull-up Torque - NEMA MG-1, Part 12 (% of Full Load Torque)

Hp	Design A and B							Design C		
RPM @ 60 HZ	3600	1800	1200	900	720	600	514	1800	1200	900
RPM @ 50 HZ	3000	1500	1000	750	-	-	-	1500	1000	750
0.75	-	-	120	100	100	100	100	-	-	-
1	-	190	120	120	100	100	100	195	180	165
1.5	120	175	115	115	100	100	100	195	175	160
2	120	165	110	110	100	100	100	195	175	160
3	110	150	110	110	100	100	100	180	175	160
5	105	130	105	105	100	100	100	180	175	160
7.5	100	120	105	105	100	100	100	175	165	150
10	100	115	105	105	100	100	100	175	165	150
15	100	110	100	100	100	100	100	165	150	140
20	100	105	100	100	100	100	100	165	150	140
25	100	105	100	100	100	100	100	150	150	140
30	100	105	100	100	100	100	100	150	150	140
40	100	100	100	100	100	100	100	150	150	140
50	100	100	100	100	100	100	100	150	150	140
60	100	100	100	100	100	100	100	140	140	140
75	95	100	100	100	100	100	100	140	140	140
100	95	100	100	100	100	100	100	140	140	140
125	90	100	100	100	100	100	100	140	140	140
150	90	100	100	100	100	100	100	140	140	140
200	90	90	100	100	100	-	-	140	140	140
250	65	75	90	90	-	-	-	-	-	-
300-350	65	75	90	-	-	-	-	-	-	-
400-500	65	75	-	-	-	-	-	-	-	-

BREAKDOWN TORQUE

Table 8: Minimum Breakdown Torque - NEMA MG-1, Part 12 (% of Full Load Torque)

Hp	Design A and B							Design C		
RPM @ 60 HZ	3600	1800	1200	900	720	600	514	1800	1200	900
RPM @ 50 HZ	3000	1500	1000	750	-	-	-	1500	1000	750
1	-	300	265	215	200	200	200	285	255	225
1.5	250	280	250	210	200	200	200	285	250	225
2	240	270	240	210	200	200	200	285	250	225
3	230	250	230	205	200	200	200	270	250	225
5	215	225	215	205	200	200	200	271	250	225
7.5	200	215	205	200	200	200	200	272	250	225
10	200	200	200	200	200	200	200	273	250	225
15	200	200	200	200	200	200	200	274	250	225
20	200	200	200	200	200	200	200	200	200	200
25	200	200	200	200	200	200	200	200	200	200
30	200	200	200	200	200	200	200	200	200	200
40	200	200	200	200	200	200	200	200	200	200
50	200	200	200	200	200	200	200	200	200	200
60	200	200	200	200	200	200	200	200	200	200
75	200	200	200	200	200	200	200	200	200	200
100	200	200	200	200	200	200	200	200	200	200
125	200	200	200	200	200	200	200	200	200	200
150	200	200	200	200	200	200	-	200	200	200
200	200	200	200	200	200	-	-	200	200	200
250	175	175	175	175	-	-	-	-	-	-
300	175	175	175	-	-	-	-	-	-	-
300	175	175	175	-	-	-	-	-	-	-
400-500	175	175	-	-	-	-	-	-	-	-

Table 9: Comparison of NEMA Design A and B / IEC Starting Characteristics for Normal Starting Torque Cage Motors

Number of Poles		2			4			6			8		
Hp	kW	TI	Tu	Tb	TI	Tu	Tb	TI	Tu	Tb	TI	Tu	Tb
3	2.2	160/170	110/100	230/200	215/180	150/120	250/200	155/160	110/110	230/190	130/140	100/100	205/180
5	3.7	150/160	105/110	215/200	175/170	130/120	225/200	150/150	105/110	215/190	130/130	100/100	205/180
7.5	5.5	140/150	100/100	200/200	175/160	120/110	215/200	150/150	105/110	205/190	125/130	100/100	200/180
10	7.5	135/150	100/100	200/200	165/160	115/110	200/200	150/150	105/110	200/180	125/135	100/100	200/170
15-20	11-15	130/140	100/100	200/200	150/150	105/110	200/200	135/140	100/100	200/180	125/120	100/90	200/170
25-30	18.5-22.5	130/130	100/90	200/190	150/140	105/100	200/190	135/140	100/100	200/180	125/120	100/90	200/170
40-50	30-37	120/120	100/90	200/190	140/130	100/100	200/190	135/130	100/100	200/180	125/120	100/90	200/170
60-75	45-56	105/110	95/80	200/180	140/120	100/90	200/180	135/120	100/90	200/170	125/110	100/80	200/170
100-125	75-93	100/100	90/70	200/180	110/110	100/80	200/180	125/110	100/80	200/170	120/100	100/70	200/160
150-200	110-150	100/90	90/70	200/170	100/100	90/80	200/170	120/100	100/80	200/170	120/90	100/70	200/160
250-300	186-220	70/80	65/60	200/170	80/90	70/70	175/170	100/90	90/70	175/160	60/90	60/70	175/160
350-500	260-370	70/75	65/60	175/160	80/75	70/60	175/160	60/75	60/60	175/160	60/75	60/60	175/160
600-800	450-600	60/65	60/50	175/160	60/65	60/50	175/160	60/65	60/50	175/160	60/65	60/50	175/160

Notes:

(1) First value indicates NEMA and Second value indicates IEC.
(2) TI = Locked-rotor torque, percentage of full-load torque
(3) TU = Pull-up torque, percentage of full-load torque
(4) Tb = Breakdown torque, percentage of full-load torque
(5) Minimum values with no negative tolerance
(6) Where the horsepower's are in scope, this table is for NEMA Designs A or B
(7) NEMA value corresponds to maximum horsepower and the torques for the lower horsepower(s) are equal to or greater than the value shown.

Table 10: Comparison of NEMA Design C / IEC Design H Starting Characteristics for High Starting Torque Cage Motors

Number of Poles		4			6			8		
Hp	kW	TI	Tu	Tb	TI	Tu	Tb	TI	Tu	Tb
3	2.2	*/270	*/180	*/200	255/240	175/165	225/190	225/210	160/150	200/190
5	3.7	250/255	175/180	200/200	250/225	175/165	200/190	225/200	160/150	200/190
7.5-10	5.5-7.5	250/240	175/165	190/200	225/225	160/165	190/190	200/200	140/150	190/190
15	11	225/225	160/165	190/200	200/210	140/150	190/190	200/200	140/140	190/190
20	15	200/225	140/165	190/200	200/210	140/150	190/190	200/200	140/140	190/190
30	22.5	200/210	140/150	190/190	200/210	140/150	190/190	200/200	140/140	190/190
40-50	30-37	200/200	140/150	190/190	200/200	140/150	190/190	200/200	140/140	190/190
75-200	55-150	200/200	140/140	190/190	200/200	140/140	190/190	200/200	140/140	190/190

Notes:

(1) Please refer above Notes from (1) to (6)
(2) *Not defined in NEMA. Design B torques normally adequate for 3 Hp or less.
(3) This table is for NEMA Design C and IEC Design H

POLYPHASE MOTORS LARGER THAN 500 Hp

Rating large than those listed in Tables 6, 7, and 8 are not covered by NEMA design letters, but have minimum torques established by NEMA MG-1 as follows:

Table 11: Motor Torque - NEMA MG-1, Part 20

Torque	*Minimum % of Rated Full-Load Torque
Locked-Rotor	60
Pull-up	60
Breakdown	175

* Higher values can be quoted for specific applications.

Locked-rotor current of these designs will normally not exceed 650% of full-load current, and will normally be within NEMA locked-rotor KVA limits for a code G or H motor.

SINGLE-PHASE MOTORS

NEMA DESIGN L

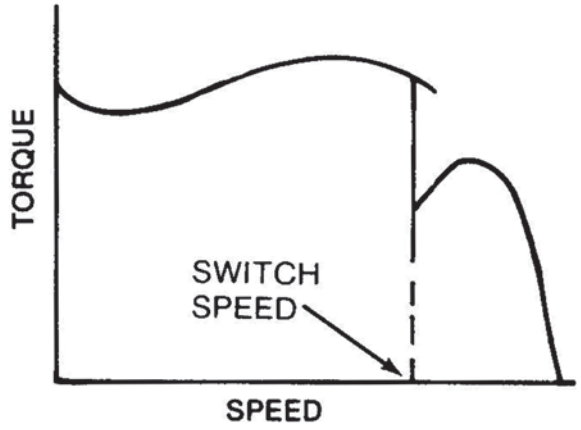


Figure 13: Typical NEMA Design L Speed/Torque Curve

A NEMA Design L motor is a single-phase integral horsepower motor designed to withstand full-voltage starting. The GE offering to meet design limits of design L is a type KC.Starting performance of type KC motors is dependent upon an additional winding controlled by a centrifugal mechanism and switch. Upon energization of the motor, both windings and the run winding of the motor are connected to the line. As the motor comes up to speed, the centrifugal mechanism will actuate and open the switch, removing the start provisions from the line. The RPM at which this occurs is known as “switch speed”. The motor will then operate at full-load with only the run windings connected.

Breakdown torques developed by Design L motors are shown in the following table:

Table 12: Single-phase (Design L) Breakdown Torque in lb-ft (NEMA MG-1, Part 10)

	Frequency (HZ)					
	60	50	60	50	60	50
	Synchronous Speed					
Hp	3600	3000	1800	1500	1200	1000
1	-	-	5.16-6.8	6.19-8.2	6.9-9.2	*
1.5	3.6-4.6	4.3-5.5	6.8-10.1	8.2-12.1	9.2-13.8	
2	4.6-6.0	5.5-7.2	10.1-13.0	12.1-15.6	13.8-18.0	*
3	6.0-8.6	7.2-10.2	13.0-19.0	15.6-22.8	18.0-25.8	*
5	8.6-13.5	10.2-16.2	19.0-30.0	22.8-36.0	25.8-40.5	*
7.5	13.5-20.0	16.2-24.0	30.0-45.0	36.0-54.0	40.5-60.0	*
10	20.0-27.0	24.0-32.4	45.0-60.0	54.0-72.0	*	*

* NO torque values have been established for these ratings

Maximum locked-rotor currents for Design L, 60 HZ motors are shown in the following table:

Table 13: Single-phase Maximum Locked-Rotor Current in Amperes at 230 Volts - NEMA MG-1, Part 12.34

Hp	Amps
1	45
1.5	50
2	65
3	90
5	135
7.5	200
10	260

SERVICE FACTOR

Service factor is defined as the permissible amount of overload a motor will handle within defined temperature limits. When voltage and frequency are maintained at nameplate rated values the motor may be overloaded up to the horsepower obtained by multiplying the rated horsepower by the service factor shown on the nameplate. However, locked-rotor torque, locked-rotor current and breakdown torque are unchanged. NEMA has defined service factor values for standard polyphase dripproof, 60 HZ motors as shown in the following table:

Table 14: Service Factor - NEMA MG-1, Part 12

	Synchronous Speed						
Hp	3600	1800	1200	900	720	600	514
1	1.25	1.15*	1.15*	1.15*	1.0	1.0	1.0
1.5-125	1.15*	1.15*	1.15*	1.15*	1.15*	1.15*	1.15*
150	1.15*	1.15*	1.15*	1.15*	1.15*	1.15*	1.0
200	1.15*	1.15*	1.15*	1.15*	1.15*	1.0	1.0
over 200	1.0	1.15*	1.15*	1.15*	1.15*	-	-

Note: Over 250 HP - Synchronous speed may vary after 1800 RPM

* These service factor apply only to NEMA design A, B, and C motors.

MOTOR TEMPERATURE

A major consideration in both motor design and application is heat. Excessive heat will accelerate motor insulation deteriation and cause premature insulation failure. Excessive heat may also cause a breakdown of bearing grease, thus damaging the bearing system of a motor.

The total temperature a motor must withstand is the result of two factors: external, or ambient temperature; and internal, or motor temperature rise. An understanding of how these components are measured and expressed is important for proper motor application.

For a given application, the maximum sustained ambient temperature, measured in degrees Centigrade (Celsius), should be determined. The ambient temperature is the temperature that the motor sees. If the motor is in a housing or chamber, then the ambient temperature is the temperature inside the housing. Most motors are designed to operate in a maximum ambient temperature of 40°C.

The temperature rise is the result of heat generated by motor losses during operation. At no-load, friction in the bearings, core losses (eddy current and hysteresis losses), and stator I^2R losses contribute to temperature rise; at full-load, additional losses which cause heating are rotor I^2R losses and stray load losses. (NOTE: I=current in amps and R=resistance of the stator or rotor in ohms).

Motor current increases with an increase in load and under locked-rotor, temperature rise will be significantly higher under these conditions. Therefore, applications requiring frequent starting and/or frequent overloads may require special motors to compensate for the increase in total temperature.

MOTOR COOLING

The total temperature of a motor is greater than the surrounding environment; heat generated during motor operation will be transferred to the ambient air. The rate of heat transfer affects the maximum load and/or the duty cycle of a specific motor design. Factors affecting this rate of transfer are:

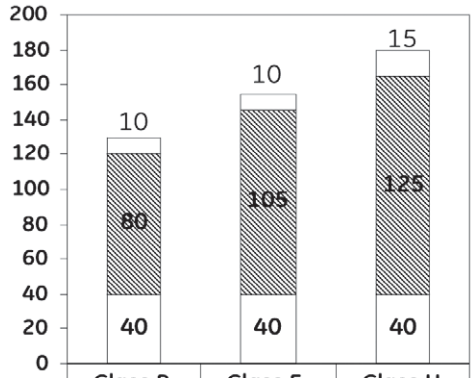
1. **Motor Enclosure**
   Different enclosures result in different airflow patterns which alter the amount of ambient air in contract with the motor.
2. **Frame Surface Area**
   Increasing the area of a motor enclosure in contact with the ambient air will increase the rate of heat transfer. General Electric motor enclosures often are cast with many ribs to increase their surface area for cooler operation.
3. **Airflow over motor**
   The velocity of air moving over the enclosure affects the rate of heat transfer. Fans are provided on most totally enclosed and some open motors to increase the velocity of air over the external parts.
4. **Ambient air density**
   A reduction in the ambient air density will result in a reduction of the rate of heat transfer from the motor. Therefore, total operating temperature increases with altitude. Standard motors are suitable for operations up to 3300 feet; motors with service factor may be used at altitudes up to 9900 feet at 1.0 service factor.

INSULATION CLASS vs. TEMPERATURE

NEMA has classified insulation systems by their ability to provide suitable thermal endurance. The total temperature is the sum of ambient temperature plus the motor's temperature rise. The following charts illustrate the maximum total motor temperature allowed for each of the standard classes of insulation. An additional 10°C measured temperature rise is permitted when temperatures are measured by detectors embedded in the winding. Figures 14-17 illustrate the temperature rise limits established for various insulation classes per NEMA MG-1, Part 12.

NOTE: It has been observed that for every 10°C above rated insulation temperature [i.e. for a class F insulation system if a motor runs at 165°C (exceeding the 155°C)], then the thermal insulation life is cut to half. So, for every 10°C below the rated temperature, the insulation life is doubled.

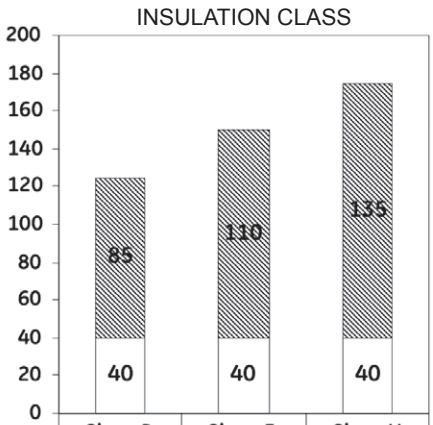
ENCLOSURE: DRIPPROOF OR TEFC
SERVICE FACTOR: 1.0



	Class B	Class F	Class H
Hotspot	10	10	15
Rise by resistance	80	105	125
Ambient	40	40	40
Total Maximum	130	155	180

Figure 14

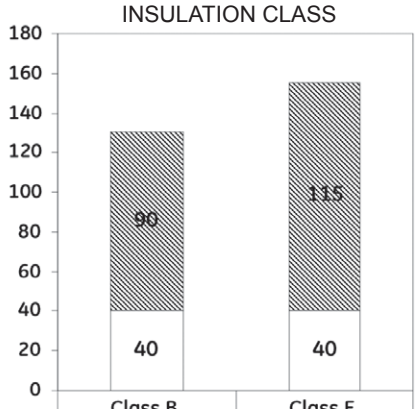
ENCLOSURE: TENV SERVICE FACTOR: 1.0



	Class B	Class F	Class H
Rise by resistance	85	110	135
Ambient	40	40	40

Figure 15

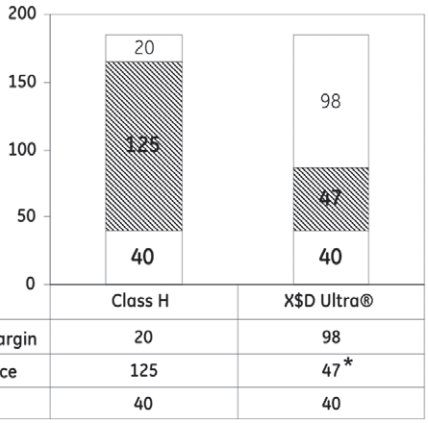
ENCLOSURE: DRIPPROOF OR TEFC SERVICE FACTOR: 1.15



	Class B	Class F
Rise by resistance	90	115
Ambient	40	40

Figure 16

ENCLOSURE XSD ULTRA® SERVICE FACTOR: 1.0



	Class H	X$D Ultra®
Temperature Margin	20	98
Rise by resistance	125	47*
Ambient	40	40

Figure 17

***NOTE:** 47 C is the weighted average temperature rise for XSD Ultra® Motors, per Ecomagination Product Review (EPR -rev 11-29-2010)

DUTY CYCLE APPLICATIONS

TYPES OF DUTY

The duty cycle of a motor describes the energization/deenergization, and load variations, with respect to time for any given application. Duty cycle applications may be divided into three basic classifications:

1. **Continuous duty** is a requirement of service that demands operation at an essentially constant load for an indefinitely long time. This is the most common duty classification and accounts for approximately 90% of motor applications. To size a motor for a specific application with this duty cycle classification, select proper horsepower based upon continuous load.
2. **Intermittent duty** is a requirement of service that demands operation for alternate intervals of load and no-load; or load and rest; or load, no-load and rest; each interval of which is definitely specified. Select a motor for these applications to match the horsepower requirements under loaded condition. In some instances, such as a hoist or elevator application, savings in the purchase price of a motor may be possible by designing for the intermittent duty cycle. 30 or 60 minute motors are normally specified. Frequent starts, however, can increase motor heating.
3. **Varying duty** is a requirement of service that demands operation at loads and for intervals of time, which may be subject to wide variation. For this classification of duty cycle, a horsepower versus time curve will permit determination of the peak horsepower required and a calculation of the root-mean-square (RMS) horsepower will indicate the proper motor rating from a heating standpoint. The following example demonstrates the method for selecting a motor for a varying duty cycle based upon peak horsepower and RMS horsepower requirements assuming constant frequency.

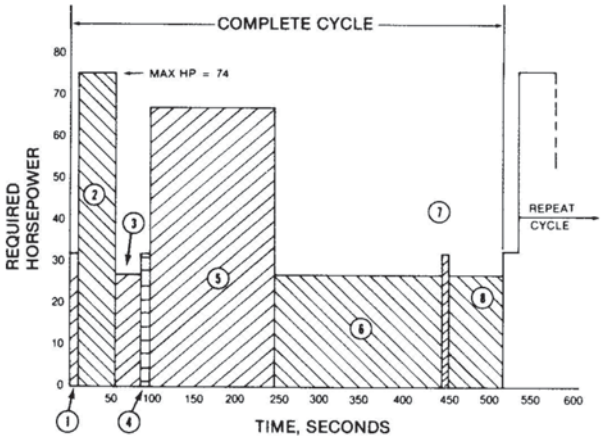


Figure 18: Duty Cycle Calculations

To properly size a motor for the varying duty cycle described in the preceding horsepower versus time graph, a table should be made as shown quantifying each part of the cycle. The first three columns of the table list data from the graph, and fourth column is derived by squaring the horsepower and multiplying by the time for each part of the cycle. Using this data, sum the periods of time and $(Hp)^2t$, and evolve the RMS horsepower as follows:

Table 15

Part of Cycle	Time Sec. (t)	Required Hp	$(Hp)^2t$
1	15	32	15,360
2	40	74	219,040
3	30	27	21,870
4	5	32	5,120
5	148	66	644,688
6	200	27	145,800
7	12	32	12,288
8	70	27	51,030
	520		1,115,196

$$\text{RMS Hp} = \sqrt{\frac{\Sigma\,(Hp)^2t}{\Sigma\,t}}$$

RMS Hp = Root - Mean - Square Horsepower

$$\text{RMS Hp} = \sqrt{\frac{1{,}115{,}196}{520}} = \sqrt{2{,}145} = 46.3\ \text{Hp}$$

The load RMS horsepower is used to determine the required motor thermal capability at constant speed. To allow for ±10% voltage variation and the resulting additional motor heating, particularly at peak loads and 90% voltage, a 10% allowance is added to the RMS horsepower calculation:

Required Hp = RMS Hp x 1.10
46.3 x 1.10 = 50.9 Hp

The motor's usable horsepower is determined by the nameplate Hp x service factor and must be equal to or greater than the required horsepower. In our example, there is a choice of either a 50 Hp motor with a 1.15 service factor or a 60 Hp motor at a 1.0 service factor. From a thermal viewpoint, either of these ratings is suitable for the required load Hp of 50.9, but the peak load still needs to be considered.

The motor must also be capable of carrying the peak horsepower (torque) value from the duty cycle at 90% voltage. Since motor breakdown torque is reduced by the voltage squared, the required breakdown torque (BDT) is determined by the equation:

$$\%\text{BDT} = \left[\frac{\text{Peak-Load Hp X 100}}{\text{NP Hp X } .9^2}\right] + 20 \text{ (see note)}$$

$$= \left[\frac{\text{Peak-Load Hp X 123}}{\text{NP Hp}}\right] + 20$$

NP Hp = Nameplate Rated Horsepower
%BDT = Percent Breakdown Torque

NOTE: Margin of 20% added to prevent inefficiencies of operation too close to actual breakdown torque.

For Example, with a 50 Hp motor at 1.15 SF:

%BDT + [74/50 x 123+20] = 202%

For 60 Hp at 1.0 SF:

%BDT = [74/60 x 123+20] = 172%

Conclusion: Since the NEMA breakdown torque for a 50 Hp or 60 Hp motor is 200%, the best choice for the application is the 60 Hp rating which only requires 172% at the peak-load horsepower.

DUTY CYCLES PER IEC

Standardized coded duty cycles for use of purchaser to define the expected or any equivalent loading condition, and which may be used by the manufacturer in defining the rating. The basic duty types are:

- S1- Continuous running duty
- S2- Short time Duty
- S3- Intermittent periodic duty
- S4- Intermittent periodic duty with starting
- S5- Intermittent periodic duty with electric braking
- S6- Continuous operation periodic duty
- S7- Continuous operation periodic duty with electric braking.
- S8- Continuous operation periodic duty with related load / speed changes
- S9- Duty with one-periodic load and speed variations
- S10- Duty with not more than 4 discreet values

STARTING LOAD INERTIA (WK²)

In any type of duty cycle operation, it is necessary to determine not only the horsepower requirements but the number of times the motor will be started, the inertia of the driven machine, the type of load (constant or variable torque) and the method of stopping the motor.

The inertia (WK²) of the rotating parts of the driven equipment affects the acceleration time and motor heating during acceleration. The heating of motor rotor and stator during frequent starting, stopping, and /or reversals can become a design limitation.

If the motor is direct connected, the inertia supplied by the equipment manufacturer may be used as is. If the motor is to drive the equipment through a pulley or gear such that the driven equipment is operating at a higher or lower speed than the motor, it is necessary to calculate the inertia referred to the motor shaft: that is, an equivalent inertia based on the speed of the motor.

$$WK^2 \text{ (Referred to Motor Shaft)} = WK^2 \text{ (Driven Equipment)} \times \frac{RPM^2 \text{ (Driven Equipment)}}{RPM^2 \text{ (Motor)}}$$

The method of stopping the motor is also taken into consideration in a duty cycle calculation. For example, if the motor is allowed to coast to a stop or mechanical braking is used; the RMS horsepower calculation may be affected. Plug stopping DC braking increases motor heating considerably. Therefore, the method of stopping must be part of the duty cycle data provided.

STARTING FREQUENCY

A special kind of duty cycle is one in which a motor is required to perform repetitive starts with a given load and connected inertia. Motor selection must take into account the motor heating caused by starting frequency, load inertia and running load.

A motor during acceleration draws about 6 times full-load current, so resistance losses during starting are up to 36 times (current squared) the losses at full-load. A motor operating on a low inertia load (pump) may come up to speed vary quickly, in less than one second. Starting losses may be so low that the start cycle could repeated several times per minute without overheating the winding. However, motor life can be limited by mechanical starting stresses. When frequent starting is planned refer to NEMA MG-10.

HIGH INERTIA LOADS

At the other extreme, the same motor connected to a high inertia load (such as a large centrifugal blower) could burn out before getting up to full speed on the first start. Motor applications involving frequent starts or high load inertia must be carefully studied to obtain satisfactory operation and long motor life.

The following table lists recommended maximum load inertias for type K, KB, KG, KS and KGS, KBS 60 HZ or 50 HZ, motor starting a fan or centrifugal pump load for two successive cold starts or one start from rated load temperature. The cold stars should be possible within 10 seconds of each other at rated frequency and voltage, and permitted by conventional control. It is recommended, however, that high inertia drives have thermal protection in the motor to prevent burnout from misapplication or excessive starting frequency.

Table 16: Maximum load Inertia NEMA MG-1, parts 12 and 20

	Speed, RPM						
Hp	**3600**	**1800**	**1200**	**900**	**720**	**600**	**514**
	Load WK² (Exclusive of Motor WK²) lb - ft²						
1	-	5.8	15	31	53	82	118
1.5	1.8	8.6	23	45	77	120	174
2	2.4	11	30	60	102	158	228
3	3.5	17	44	87	149	231	335
5	5.7	27	71	148	242	375	544
7.5	8.3	39	104	208	256	551	798
10	11	51	137	273	467	723	1048
15	16	75	200	400	684	1060	1540
20	21	99	262	525	898	1393	2018
25	26	122	324	647	1108	1719	2491
30	31	144	384	769	1316	2042	2959
40	40	189	503	1007	1725	2677	3881
50	49	232	620	1241	2127	3302	4788
60	58	275	735	1473	2524	3819	5680
75	71	338	904	1814	3111	4831	7010
100	92	441	1181	2372	4070	6320	9180
125	113	542	1452	2919	5010	7790	11310
150	133	640	1719	3456	5940	9230	-
200	172	831	2238	4508	77050	12060	-
250	210	1017	2744	5540	9530	14830	-
300	246	1197	3239	6540	11270	-	-
350	281	1373	3723	7530	-	-	-
400	315	1546	4199	8500	-	-	-
450	349	1714	4666	9460	-	-	-
500	381	1880	5130	-	-	-	-
600	443	2202	6030	-	-	-	-
700	503	2514	-	-	-	-	-
800	560	2815	-	-	-	-	-

POWER FACTOR

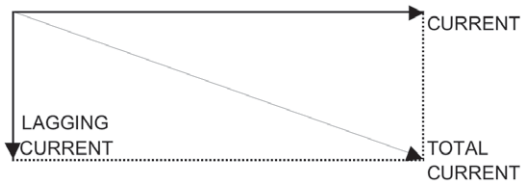
In a sense, motors are electromagnets and power factor is a measure of the amount of magnetizing current required.

Power factor is an important consideration when selecting a motor for particular application since low power factor may result in power factor penalty charges from the utility company. Power companies must supply KVA but normally meters only kilowatts used, low motor power factor requires additional KVA with low return on kW utilized; hence, power factor penalties.

Following is the equation for power factor in a three-phase system:

$$\text{Amps} = \frac{\text{Watts input}}{\sqrt{3} \times \text{Volts} \times \text{PF}}$$

The equation below is a numerical method of expressing the phase difference between voltage and current in a motor circuit. The current in an induction motor lags the applied voltage, and only the component that is in phase with the voltage varies with motor power. The relationship expressed in the above equation can be show as a vector relationship in which the numerical expression is actually the cosine of the angle L.

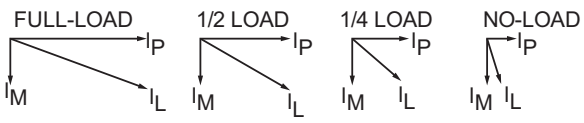


$$\text{PF} = \frac{\text{Watts input}}{\sqrt{3} \times \text{Volts} \times \text{Amps}}$$

Figure 19

As seen from their relationship, line current required for a given motor output varies inversely with power factor. Increasing power factor will reduce the required line current, thus reducing voltage drop in power lines and transformers.

The lagging current shown above is actually motor magnetizing current, which is dependent upon motor design. This magnetizing current is independent of motor load; i.e., just as much required at no-load as at full-load. Thus power factor at partial loads is never as high as at full-load, and at no-load power factor is essentially zero.



I_P = In-phase Current
I_M = Magnetizing Current
I_L = Total Current

Figure 20

There are two basic methods for improving the power factor of a motor for a particular application:

1. Purchase a motor with an inherently high power factor.
2. Install power factor correction capacitors. Capacitors draw leading current as opposed to the lagging current drawn by induction motors. Placing capacitors in parallel with the motor windings will result in leading current offsetting some of the lagging current, increasing power factor as shown in Figure 21:

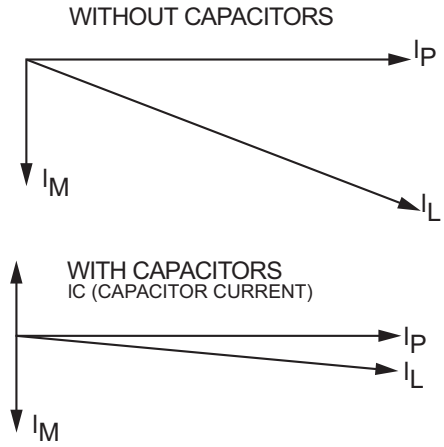


Figure 21: Power Factor Correction

For many applications the use of capacitors for power factor correction is the most economical method and one that also works at partial loads. Capacitors should be used to improve full load power factor to approximately 95% maximum.

WARNING: IN NO CASE SHOULD POWER FACTOR IMPROVEMENT CAPACITORS BE APPLIED IN RATINGS EXCEEDING THE MAXIMUM SAFE VALUE SPECIFIED BY THE MOTOR MANUFACTURER, EXCESSIVE IMPROVEMENT MAY CAUSE OVER EXCITETATION RESULTING IN HIGH TRANSIENT VOLTAGES, CURRENTS AND TORQUES THAT CAN INCREASE SAFETY HAZARDS TO PERSONNEL AND CAUSE POSSIBLE DAMAGE TO THE MOTOR OR TO THE DRIVEN EQUIPMENT.

WINDING CONNECTIONS AND STARTING

The design of a motor's windings and the pattern of connecting the leads from these windings will determine voltage ratios for dual-voltage motors and may also determine what starting options are available.

Following is a brief description of some of the more popular starting methods:

1. **Full Voltage Starting**
   This method is the least expensive from a initial cost standpoint and is the most commonly used starting method on smaller motors. While it results in the highest inrush current values, connections and starter operation are greatly simplified. All standard motors are designed for full voltage (across-the-line) starting.

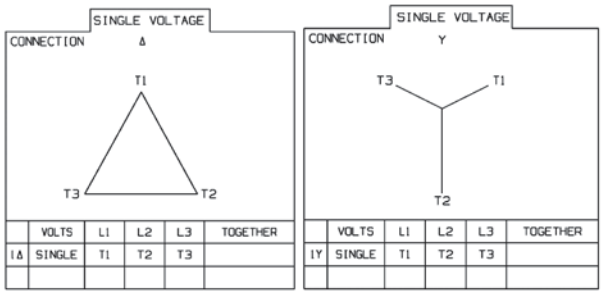
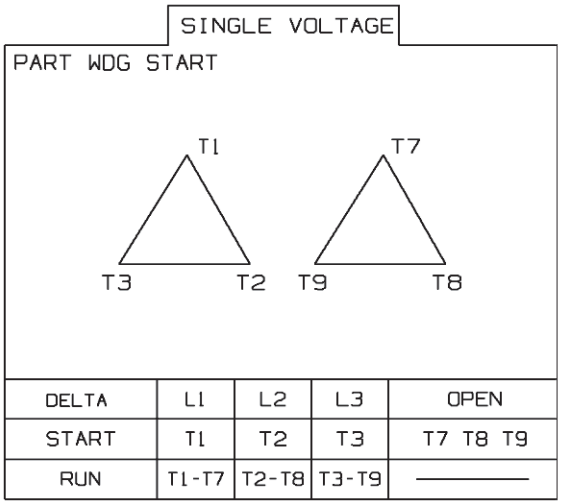


Figure 22: Full Voltage Starting/Direct-On-Line (DOL) Starting

2. **Part Winding Starting (PWS)**
   This method energizes only part of the total winding when the motor is started and is suitable for pump, fan and compressor loads. PWS will reduce inrush current, but the motor heating rate will increase considerably. There are no standard performance requirements for part winding starting and, therefore, a motor started in this manner may fail to accelerate a high-inertia or constant torque load. PWS usually requires special winding connections, which must be specified at the time the motor is ordered.



DELTA	L1	L2	L3	OPEN
START	T1	T2	T3	T7 T8 T9
RUN	T1-T7	T2-T8	T3-T9	———

Figure 23: Part Winding Start

3. **Autotransformer Starting**
   In contrast to part winding start, autotransformer starting uses the complete motor winding but limits input voltage to reduce inrush current. The most commonly furnished taps on autotransformer starters are 50, 65, and 80% of full voltage and most also provide an adjustable timer for switching to full voltage after the motor has accelerated. No special motor winding is required.

Table 17: Autotransformer Starter

Transformer Tap	% Full Load Torque		
	Voltage & Current at Motor	Supply Line Current	Motor Output Torque
80% Tap	80	64*	64
65% Tap	65	42*	42
50% Tap	50	25*	25

*Autotransformer magnetizing current not included. Magnetizing current is usually less than 25 percent of motor full-load current.

4. **Wye Start/Delta Run**
   This connection method allows a motor to be started at reduced load with reduced phase voltage and, therefore, with reduced inrush current. Wye Delta starters may be furnished with either open or closed transitions. Open transition, generally lower in cost, will produce higher transient current than a closed transition starter at the transition from wye to delta.

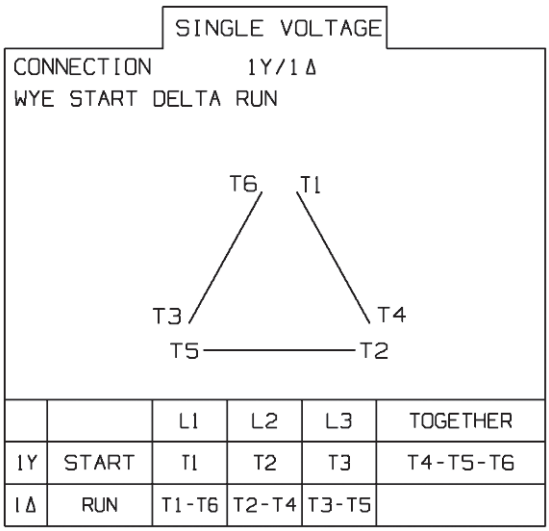


Figure 24: Wye Start/Delta Run

TWO-SPEED MOTORS

Description:
Two-speed motors are applied where the operation of two definite speeds are desired. The motors are classified as to the relation of full-load torques at rated speeds: i.e., constant torque, variable torque and constant horsepower.

Product Line:

NEMA Design	NEMA design does not apply for multi-speed motors (GE Types K, KS)
Enclosure	Dripproof or Totally-Enclosed, Explosion-Proof Fan-Cooled
Frame	182-5011
Voltage	200, 230, 460, 575
Frequency and Phase	60 HZ, 3-phase
Ambient	40°C, Dripproof, 1.15 Service Factor; 40°C, TEFC, 1.0 Service Factor
Rating	1 through 800 horsepower • One winding, Variable torque and constant torque

Application:
Different speeds are obtained by switching electrical connections. The speed on each connection has the constant speed characteristic typical of single-speed induction motors. Two-speed motors may have a single re-connectible winding or two independent windings.

It is possible to arrange a single winding so that it can be re-connected for a different number of poles (and speed) by suitable re-connection of the leads. However, such an arrangement will permit only two speeds and the speeds must be in the ratio of two-to-one.

An alternate way of securing two speeds is to have two separate windings, each wound for a different number of poles and speed.

Such an arrangement means that one winding is not in use when the other is connected to the line; motor frame sizes usually are larger in order to accommodate the idle winding. But the use of two windings permits two speeds which are not in the ratio of two-to-one. Speeds with a two-to-one ratio can be delivered by two-winding motors as well as by single-winding motors.

The choice between one winding and two winding motors is affected by the speeds desired, the motor price, the control price, wiring complexity and physical size. One winding motors have lower prices than two winding motors, but usually require more expensive controls.

Two-speed motors are classified by the relation of the full-load torques at the two full-load speeds.

If the motor has the same full-load torque at both speeds, the motor is a constant torque motor. Since constant torque motors have the same full-load torque at both speeds, the horsepower ratings for the two speeds are in the same ratio as the speeds. For example, the low speed rating of a 10 Hp 1800/900 RPM constant torque motor is 5 Hp.

If the full-load torques are in the same ratio as the speeds, the motor is a variable *torque motor*. The horsepower at the low speed, involving both reduced torques and speed, compares to the high speed in ratio of the square of the speeds. Therefore, in the case of a 10 Hp 1800/900 RPM variable torque motor, the low speed horsepower is 2 1/2 using the following equation:

$$Hp_{LOW} = Hp_{HI} \left[\frac{RPM_{LOW}}{RPM_{HI}} \right]^2$$

If the full-load torque value at the two speeds varies inversely to the speed, the motor is designated constant-horsepower.

The horsepower listing of two-speed motors always applies to the highest speed. The horsepower ratings at the lower speeds are determined by the particular speed and the motor's torque classification. Motor horsepower is a direct function of both torque and speed.

For each speed of a two-speed motor, the horsepower rating must be equal to, or greater than, the horsepower required by the driven load at each speed.

Constant-torque motors are used on friction type loads, or where the work being done is in direct proportion to the speed. Typical examples of constant torque loads are conveyors, escalators and positive displacement pumps or compressors.

Variable torque motors are normally applied to fans, centrifugal blowers and centrifugal pumps which put a horsepower load on the motor which varies as the cube of the speed. If the motor output is adequate for the high speed load, it is sure to have enough Hp at the lower speeds since the motor Hp reduces only as the square of the speed.

Constant horsepower motors are applied on machines that must handle a heavier weight or a greater cut (machine tools) on lower speed than on high speed. For example, a metal-cutting lathe would use the high-speed connection for a light finish cut, but the low-speed connection for taking off large chips in a rough cut.

Two-speed ratings may have lower starting torques than the corresponding single speed ratings.

Two-speed motors are connected in various ways requiring special control, whether manual or magnetic, for starting, changing speeds and stopping. Since the full-load current for high speed is different from that for the lower speeds, separate independent thermal overload relays with correctly selected heaters are required in the control to completely protect the motor on all speed connections.

An alternate is to specify two-speed motors equipped with heat-sensing protectors, built into the windings to positively prevent burnouts caused by overloads, stalling, lack of ventilation, single-phasing or unbalanced voltages regardless of speed, winding connection or ambient temperature.

Two-speed motors are supplied for a single voltage. Motors larger than 365T frame are not furnished for voltages below 460 volts at 60 HZ (380 volts at 50 HZ).

Two-speed motors may be started on any speed either on full voltage, or on reduced voltage by resistor, reactor or autotransformer starters. They are not available for wye-delta or part winding starting.

ELECTRICAL MODIFICATIONS

CABLE GLANDS

Cable gland is used to provide weather proof of a single round multi-conductor cable in to the motor conduit box. Customer must supply cable outer diameter. Cable size is limited from .25 to 3.5 inch diameter for both unarmored and armored cable glands.

CURRENT TRANSFORMER

It is sometimes desirable on larger motors to have current transformers installed in the motor conduit box for operation of auxiliary devices or sensing circuits. Motors in frames 509-5013 can be furnished with single-secondary current transformers in the main or neutral leads. These can include window-type transformers or bar-type transformers to meet the specifications of the user or the control manufacturer and must be fully specified by the customer. Current transformers require an oversize conduit box which must be included in the order.

GROUNDING PROVISIONS

Special grounding provisions can be supplied in the conduit box, on the frame, or for mounting in the drive end shield. The special conduit box grounding provision consists of a brass stud in place of one of the conduit box mounting screws. Also included are two jam nuts for mounting to an external ground lead.

Hardware for the endshield grounding option is shipped as a kit including a brass stud, nut and washer. The stud is assembled in place of one of the endshield bolts.

GROUNDING

1. **Conduit box ground**
   XSD Ultra® and severe duty are provided with a bronze grounding stud inside the conduit box. On Open motors the bronze grounding stud is provided on request however customer can use the labeled conduit box fixing bolts for grounding.
2. **Endshield Ground Bolt Kit**
   Endshield ground bolt kits are available for 140 thru 500 frame product except Quantum. These kits are not allowed for the use on Division I motors.
3. **Servit Post**
   Servit post is mounted on frame close to the base of the motor. This option is not allowed on Division I motors. The frame ground wire is passed through a hole in the servit post by the end user.
4. **Ground Pad**
   NEMA type ground pads on frame can be provided on request. These ground pads consist of a bronze bolt and copper washer mounted on a spot face area located on conduit box side near foot.

Table 18

Frames	Max Full Load Amps	Bolt Size	Qty
143-286	160	5/16"-18 UNC	1
143-286	250	3/8"-16 UNC	1
500	1200	0.500-13 UNC	2
324-5013	600	0.500-13 UNC	1
324-5013	1200	0.500-13 UNC	2

LEADS, SPECIAL

All motors are provided with standard leads of ample length for easy connection in the conduit box to the power leads. Lead size and material are dependent upon the class of insulation system in the motor and the current capacity required. Longer than standard leads are available on request.

SPACE HEATERS

Space heaters are used to prevent moisture condensation in the motor when it is not running. They are generally mounted on the opposite connect end of the stator on the OD of the end turns.

GE space heater kits are designed to raise the temperature of winding 6.5 to 9 degree C above the ambient with an initial rate of rise 3.5 degree C per hour. They are suitable for use on both single phase AC and DC voltage supplies. Surface temperature during operation is approximately 200 degrees C.

Special Div II Space Heaters: GE Power Conversion has developed and patented a thermostatically controlled space heater. These heaters are provided with hermetically sealed thermostat so they only operate with a maximum surface temperature of 140 degree C and do not spark in an end of life event. In order to limit surface temperature rise during operation, these heaters operate at watt densities significantly lower than standard heaters. The thermostat limits the maximum temperature resulting from motor residual temperature (occurring as a result of motor operation), ambient temperature, and space heater temperature. During continued normal operation with a 40 degree C ambient, the surface temperature will remain below the thermostat setting; which will increase the life of the heater. The thermostat opening temperature might be exceeded due to high ambient and/or motor residual temperatures.

In most cases when a motor is shut down, the space heaters are immediately turned on. As the motor may take many hours to cool down, the heaters being automatically turned on can result in a cumulative hear that may result in temperatures that approach the 80% Auto-Ignition Temperature or AIT limit. A thermostatically controlled heater will not allow the heater to energize until the motor has sufficiently cooled down (below 140°C thermostat reset temperature) thereby not allowing the temperatures to exceed the stated AIT.

STARTING CURRENT, LOWER THAN STANDARD

The starting current code (KVA-per-horsepower) for polyphase 60 HZ motors in the integral-Hp sizes is typically code G. Reducing the amount of starting current to code F limits or lower may require more material, increased frame size or a combination of these factors. Starting torque and breakdown torque may also be reduced to less than NEMA design B limits.

SURGE PROTECTION

Surge Capacitors and Surge Arrestors (Lighting Arrestors) Surge protection capacitors and lighting arrestors can be supplied on 500 frame motors as a package in an oversize conduit box for mounting adjacent to the motor.

Surge capacitors and Lighting Arrestors are used to protect the motor from voltage spikes on the power line. Surge capacitors are available without surge arrestors. Surge arrestors are available only with surge capacitors.

TEMPERATURE RISE, SPECIAL

NEMA has defined allowable winding temperature rise according to class of insulation and maximum ambient temperature. Where there are requirements for special low winding temperature rise, please contact the Company for review of the available options.

TERMINALS, SPECIAL

All motors, except as mentioned below are supplied with ring terminal (illustrated in Figure 25):

- Non-XSD Ultra Motors in Frames 140-280, will be supplied with lead wire stripped for connection to power leads.

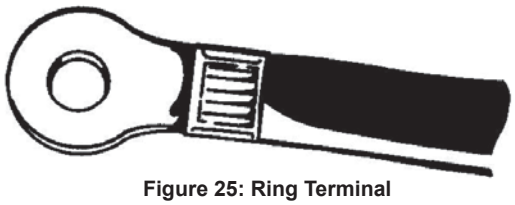


Figure 25: Ring Terminal

Leads range in size from 18 gauge to 8 gauge depending on the amount of current that the motor produces.

THERMAL PROTECTION - WINDING

The following devices are applicable only to motors with class F or H insulation with class B or F temperature rise.

Built-in protective devices to prevent motor overheating may be either: (A) Line interrupting devices which open the power supply when the motor overheats or (B) pilot devices. The latter open the holding coil circuits of a magnetic switch to take the motor off the line, or energize alarm bells or warning lights. Motors taken off line by pilot devices typically cannot be restarted until an operator recloses the magnetic starting switch.

A. Line-interrupting Devices - Current-Sensing Thermal Protectors

These protectors sense both motor temperature and current and offer inherent protection against all abnormal stalled and running conditions. They are built into the motor conduit box for automatic* reset operation on both automatic* and manual reset operation on single-phase motors 182-215 frame.

These protectors are not available on explosion-proof motors or on two-winding two-speed motors.

*** WARNING:** A MOTOR WITH AUTOMATIC-RESET THERMAL PROTECTION SHOULD NEVER BE USED WHERE AN UNEXPECTED RESTART MAY INJURE PERSONNEL OR DAMAGE PROPERTY.

B. Pilot Devices

1. Thermostats

These protectors are not available on two-winding two-speed motors.

Thermostats are mounted on the stator winding and are temperature-sensing only. They are available with normally closed contacts and only for automatic reset.

Thermostats will protect the motor from high ambient temperature, exceedingly long accelerating cycles (where the design is not rotor limited), repeated or excessive overloads and loss of ventilation. However, they do not give protection under stalled or locked-rotor conditions and must be used with an external current-sensitive motor control for complete motor protection.

Thermostats can be installed in all motor enclosures They are not recommended for machines with name-plate voltages exceeding 600 volts.

Thermostats are suitable for the following pilot circuits:

Table 19

Power Supply	Voltage	Current
AC	110-115 volts	6.0 amp
AC	220-230 volts	3.0 amp
AC	440-480 volts	1.5 amp
AC	550 volts	1.2 amp
DC	115-125 volts	2.2 amp
DC	230-250 volts	1.1 amp
DC	550 volts	0.4 amp

2. Thermistors (Not Allowed on DIV 1 Motors)

Thermistors are small non-linear resistance devices placed in the stator windings. As the critical temperature is reached, the resistance of the thermistors changes radically, causing operation of a control relay. Normally, 3 thermistors are furnished, one per phase. Thermistors may be furnished with or without a separate control relay (greater than 600 nameplate volts).

3. Resistance Temperature Detectors

RTD's are precision wire-wound resistors with calibrated temperature-resistance characteristics. These devices are used in conjunction with customer supplied instruments and are available in 10, 100 and 120 ohm designs. Normally six RTD's (2 per phase) are furnished per motor, suitably distributed around the circumference of the stator winding, located between coil sides and positioned to detect the highest slot temperature. RTD's are constructed using a fine, pure, metallic, spring-like wire surrounded by an insulator and enclosed in a metal sheath.

- 120 Ohm Nickel
- 100 Ohm Platinum
- 10 Ohm Copper

II. MECHANICAL DESIGN

FRAME DESIGNATION SYSTEM

For footed machines, in NEMA the first 2 digits are taken and divided by 4, the resultant value indicates the height of the shaft center from the ground in inches.

A historical reference on how NEMA frame size was reduced over the years can be found at page TR.52 (on ANNEXURE B).

For example NEMA Frame 182; has a shaft center height of 18/4=4.5”.

For foot-mounted machines, the IEC frame designation system consists of the frame number that indicates the height of the shaft center from the ground in millimeters (mm).

For example IEC Frame 112S; has a shaft center height of 112mm. In the Table 20: S, M and L are variations in B (i.e. equivalent to NEMA 2F) dimension; refer to IEC 60072-1 for more details.

Table 20: Comparison of NEMA and IEC Frame Designations

IEC	90S	90L	112S	112M	132S	132M	160M	160L	180M	180L
NEMA	143	145	182	184	213	215	254	256	284	286

IEC	200M	200L	225S	225M	250S	250M	280S	280M	315S	315M
NEMA	324	326	364	365	404	405	444	445	504	505

Additional quick references for major mounting dimension between NEMA and IEC can be found on page TR.51 (ANNEXURE A).

ENCLOSURE MATERIAL

Frame and endshield materials are listed below in Table 20B.

Table 20B

Frame Size	Enclosure	Frame & Endshield Material
143-449	TE*	Cast iron or rolled steel
143-449	DP, WPI	Cast iron or rolled steel
509-5013	DP, TEFC, WPI, WPII	Cast iron
182-5013	Explosion-proof	Cast iron
143-5013	Severe-duty	Cast iron

*TE: Totally enclosed machines like TENV, TEFC, TEAO, TEBC as applicable.

Table 21: Quick Comparison of NEMA and IEC

Enclosure/Cooling Designation			
NEMA Enclosures		IEC Enclosure Codes	
		Protection	Cooling
DPFG	Drip-proof fully guarded, self-ventilated	IP-22	IC-01
ESV	Piped Ventilation (Enclosed separately Ventilated, air ducted in and out)	IP44	IC-37
TENV	Totally enclosed non-ventilated	IP44/IP55	IC-410
TEFC	Totally enclosed fan cooled	IP44/IP55	IC-411
TEAO	Totally enclosed air over frame	IP44/IP55	IC-416
TEBC	Totally enclosed blower cooled	IP44/IP55	IC-416
TENV-XP	TENV, explosion-proof	Not defined	
TEFC-XP	TEFC, explosion-proof		

DRAINS AND BREATHERS

Enclosed Motors (except explosion-proof)
Standard enclosed motor construction includes drain holes in the bottom of the motor. XSD Ultra® severe-duty motors, special plugs designed to serve as both drains and breathers are inserted into the drain holes. Available as an option is a sintered-metal breather and drain which acts as a one-way vent preventing entrance of contaminants while allowing the moisture to drain out.

Explosion-Proof
Standard explosion-proof motors are furnished without drains or breathers. Available as an option is the UL listed Crouse-Hinds breather/drain which acts as a one-way vent, preventing the entrance of contaminants while allowing the moisture to drain out.

MOUNTING CONFIGURATIONS

The following diagrams illustrate the various mounting possibilities for “horizontal” motors in NEMA and IEC.

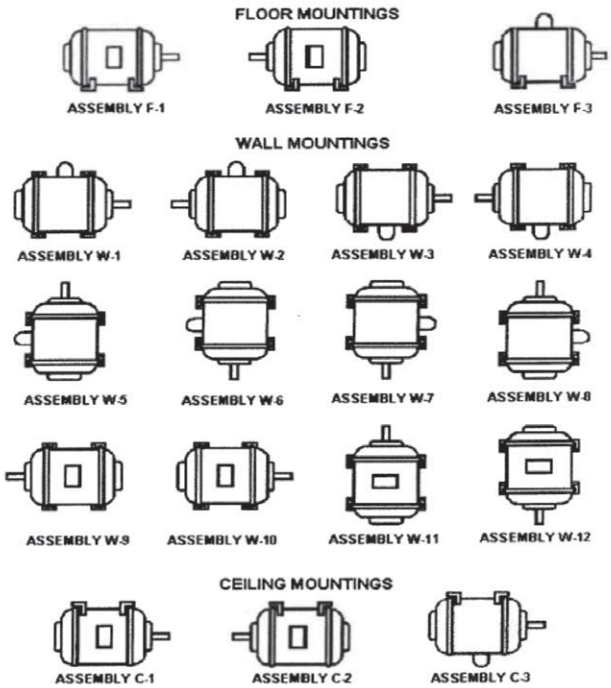
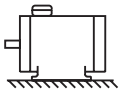
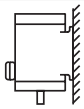
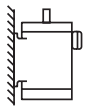
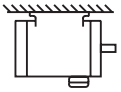


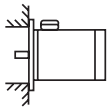
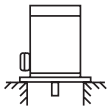
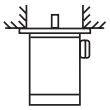
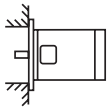
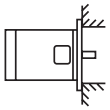
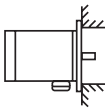
Figure 26: NEMA Mounting

IEC Motor Mounting Configurations

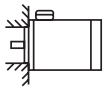
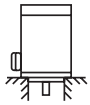
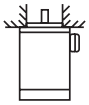
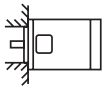
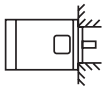
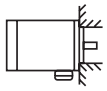
Foot Mounted Motors

Code I	IM B3	IM V5	IM V6	IM B6	IM B7	IM B8
Code II	IM 1001	IM 1011	IM 1031	IM 1051	IM 1061	IM 1071
	 Figure 1	 Figure 2	 Figure 3	 Figure 4	 Figure 5	 Figure 6

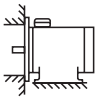
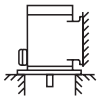
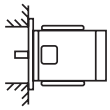
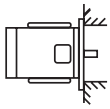
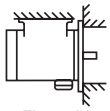
Flange Mounted Motors - Large Flange

Code I	IM B5	IM V1	IM V3	Undefined*	Undefined*	Undefined*
Code II	IM 3001	IM 3011	IM 3031	IM 3051	IM 3061	IM 3071
	 Figure 7	 Figure 8	 Figure 9	 Figure 10	 Figure 11	 Figure 12

Flange Mounted Motors - Small Flange

Code I	IM B14	IM V18	IM V19	Undefined*	Undefined*	Undefined*
Code II	IM 3601	IM 3611	IM 3631	IM 3651	IM 3661	IM 3671
	 Figure 13	 Figure 14	 Figure 15	 Figure 16	 Figure 17	 Figure 18

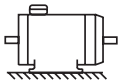
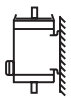
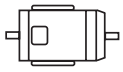
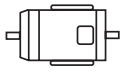
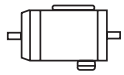
Foot and Flange Mounted Motors With Feet and Large Flange

Code I	IM B35	IM V15	IM V36	Undefined*	Undefined*	Undefined*
Code II	IM 2001	IM 2011	IM 2031	IM 2051	IM 2061	IM 2071
	 Figure 19	 Figure 20	 Figure 21	 Figure 22	 Figure 23	 Figure 24

Foot and Flange Mounted Motors With Feet and Small Flange

Code I	IM B34	IM V17	Undefined*	Undefined*	Undefined*	Undefined*
Code II	IM 2101	IM 2111	IM 2131	IM 2151	IM 2161	IM 2171
	 Figure 25	 Figure 26	 Figure 27	 Figure 28	 Figure 29	 Figure 30

Foot Mounted Motors With Free Shaft Extension

Code I	Undefined*	Undefined*	Undefined*	Undefined*	Undefined*	Undefined*
Code II	IM 1002	IM 1012	IM 1032	IM 1052	IM 1062	IM 1072
	 Figure 31	 Figure 32	 Figure 33	 Figure 34	 Figure 35	 Figure 36

* Not defined in IEC 60034-7

Figure 27: IEC Mounting

Motors may be furnished for any of the 18 mounting configurations shown in Figure 27. Other than F1 and F2 mountings, endshields need to be rotated appropriately; to ensure guarding, drain and grease inlet/outlet locations.

Unless otherwise specified, all horizontal motors will be furnished for F1 mounting.

Vertical Mounting

Typically, ball bearing motors in frames 326 and smaller mounted vertically with shaft up or down can handle external thrust loads, in either direction. See Table 26 on page TR.30.

Motors which are to be mounted vertically in either a shaft up or shaft down attitude must be reviewed by application engineering to ensure:

1. A suitable bearing and lubrication system is specified, and
2. Adequate provisions or features are considered as necessary to protect the motor from outside contaminants such as water and/or dust

Table 22: Comparison of Mounting Configurations between IEC and NEMA

Arrangement	NEMA Mounting	IEC Mounting*
Floor Mounting	F1, F2	IM B3/IM 1001
Ceiling Mounting	C1, C2	IM BB/IM 1071
Wall Mounting, Shaft Horizontal	W2, W4	IM B6/IM 1051
	W1, W3	IM B7/IM 1061
Wall Mounting, Shaft Vertical	W6, W7, W9, W10, W11, W12	IM V5/IM 1011
	W5, W8	IM V6/IM 1031

*Terminal box location as per IEC 60034-7

DYNAMIC BALANCE

General Electric motors are dynamically balanced so that vibration, as tested per NEMA standard MG-1, Part 7, will be within the limits stated below for standard balance. Motors balanced to either the special or precision balance limits shown will be furnished at additional price when specified. Precision balance is a feature of the XSD Ultra® severe-duty product line.

Table 23: Vibration Limits (140-5013 Frame)

Motors with two ball bearings Vibration measured in Inches/Sec				
RPM	**Standard**	**Special**	**Precision**	**XSD Ultra**
All Speeds	0.15	0.075	0.055	0.04

Motors with one ball bearing and one roller bearing Vibration measure in Inches (peak to peak)			
RPM	**Standard**	**Special**	**Precision**
3000-4000	0.001	0.0005	0.0003
1500-2999	0.0015	0.0008	0.0004
1000-1499	0.002	0.001	0.0005
999 and slower	0.0025	0.0013	0.0007

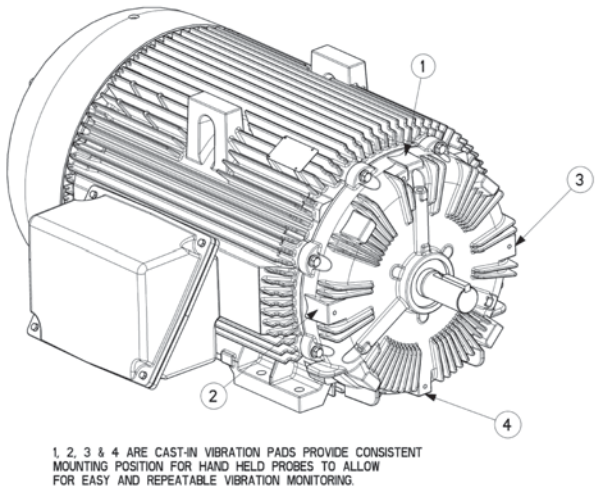


Figure 28: Shows the position of Cast-in Vibration Pads, on Standard XSD Ultra® Motors

Benefits of Lower Vibration

Machinery vibration is a significant contributor to equipment failure. To build reliable equipment it is advisable to use motors with lower vibration. GE's XSD Ultra® Vibration at rated voltage and frequency shall not exceed the limits of 0.04 inch per second. Overall vibration as evaluated by NEMA MG-1, Part 7.

Following can be the advantages of using motors with lower vibration including:

- Longer bearing life
- Reduced damage to the shafts and rotor
- Fewer equipment break-down
- Lower operational noise
- Minimum power loss hence efficient operation of equipment
- Low energy costs
- Minimum stress levels in the equipment structures

For additional information, refer IEEE Paper PCIC-2003-12

BEARING SYSTEMS

Antifriction

All standard motors are equipped with "clean steel" Conrad deep groove type ball bearings, sized for the loads to be expected in industrial applications.

Sleeve-Type

Split-sleeve bearings are available for frames 509 through 5013 in Dripproof, Weather Protected I and II, and some Totally enclosed fan cooled (Quantum design) enclosures. They should be used for direct drive applications only. For DP, WPI, and WPII enclosures, the bearings are mounted in the bottom and top halves of the split endshields. The top half endshield is removable for bearing or winding inspection. TEFC Quantum can be supplied with split sleeve bearings mounted outboard of the motor endshields. Solid sleeve bearings are available for frames 509 through 5013 totally-enclosed-fan-cooled machines (Non-Quantum). Sleeve bearings are not available on explosion-proof motors. All sleeve bearings are equipped with oil reservoirs, ring oilers, sight gauges, level gauges and drain provisions.

BEARING LUBRICATION

Ball bearing motors are shipped with sufficient grease for a long operating period. Re-lubrication at intervals consistent with the type of service shown in Table 24 will provide longer bearing life.

Excessive, too frequent lubrication or the use of non-compatible lubrication may damage the motor. If the bearing grease cavity and the bearing races have excessive grease to the point where the grease stays packed around the bearing rotating elements, the bearing will actually run hotter. Follow re-lubrication type and procedures provided in the instructions shipped with motors.

Table 24: Re-lubrication Intervals

Type of Service	Typical Examples	HP Range	Re-lubrication Interval (yrs)	
			Horizontal	Vertical
Easy	Valves, door openers, portable floor sanders, motor operating infrequently (one hour per day)	1.0-7.5 10-40 50-150 200-350 400-800	10 7 4 3 1	9 3 1.5 9 Mo. -
Standard	Machine tools, air conditioning apparatus, conveyors, one or two shifts, garage compressors, refrigeration machinery, laundry machinery, oil well pumps, wood working machinery	1.0-7.5 10-40 50-150 200-350 400-800	7 4 1.5 1 6 Mo.	3 1 6 Mo. 3 Mo. -
Severe	Motors for fans, M-G sets, etc. that run for 24 hours/365 days, coal and mining machinery, motors subject to severe vibration, steel mill machinery	1.0-7.5 10-40 50-150 200-350 400-800	4 1.5 9 Mo. 6 Mo. 3 Mo.	1.5 6 Mo. 3 Mo. 1.5 Mo. -
Very Severe	Dirty, vibrating applications, where end of shaft is hot (pumps and fans), high ambient temperatures	1.0-7.5 10-40 50-150 200-350 400-800	9 Mo. 4 Mo. 4 Mo. 3 Mo. 2 Mo.	6 Mo. 3 Mo. 2 Mo. 1 Mo. -

WINDING TREATMENT

Various winding treatment options and protective coatings are available to provide additional protection in special or extreme application and environmental conditions.

Custom Polyseal® Motors (Frames 444-5013)
These motors are available with vacuum pressure impregnated windings which have been taped to hold additional varnish and to increase their mechanical strength. Custom Polyseal® motors meet NEMA MG-1, Part 1 and are capable of an underwater submergence test which includes a hi-pot and megger test.

Trickle Treat (Random Wound - 143-449 frames)
In this process a 60 HZ current is passed through the winding. This “pumps” the varnish into the windings resulting in better penetration into the stator slots and an increase in varnish build.

Applying a controlled current to the windings produces optimal varnish curing. This cures the windings from the inside-out, rather than oven baking.

Vacuum Pressure Impregnation (500 frames)
This process completely seals the windings against moisture and harsh environments. It provides greater mechanical strength; that lowers the vibration level. Machine lasts longer and requires less maintenance.

Table 25: Quick Winding Treatment Comparison for Random Wound Motors

Winding Treatment	Vacuum Pressure Impregnation	Trickle Treatment
Penetration	Better	Best
Advantages	• Best Penetration • Leads to Sealed System	• Maximum Fill Rate • Excellent CIV Protection
Limitations	• High Investment • Longer Process Time	• Cannot Be A Sealed System

Abrasion Resistance (320-5013) ODP or WPI/WPII
GE motors can be supplied with an abrasion resistant winding treatment which gives added protection from airborne particles.

ADJUSTABLE SPEED INVERTER DUTY OPERATION

PRODUCT

NEMA Design does not apply (GE Type KAF)
Enclosure: Open Dripproof or Totally-Enclosed
Frames: 143-5013

ADJUSTABLE SPEED DRIVE (ASD™) OPERATION

Most of today's state-of-the-art inverter drives uses IGBT technology. These drives solve the electrical noise problem of the older transistor units but can create significant issues for pre-IGBT motor insulation life. The IGBT drive use frequencies that are above the audible range and can cause significant rapid voltage spikes that may shorten motor insulation life.

Motor manufacturers, through the National Electric Manufacturers Association (NEMA) technical section have defined IGBT drive output spike voltage as 3.1 times the motor nameplate voltage.

Example: NEMA MG-1-31 states 3.1 times the nameplate voltage or 460 volts x 3.1= 1425 minimal acceptable voltage spike @ .01 microsecond rise time. Similarly for 575V; the voltage spike = 575 volts x 3.1 = 1783V

Specific to this application, GE uses insulation system to withstand spike voltages up to 2400V.

XSD Ultra® GEGARD2400 incorporates Class H rated GE701 varnish, which consists of 100% solids and has no solvents that evaporate during the curing cycle.

With the use of more sophisticated designs, GE Energy has solved the spiking issue and offers drive products that keep the spike under 1000 volts and are compatible with older existing motors.

Besides the motor insulation system, the application should consider the shortest leads possible between the drive and motor (50 ft) and make sure the motor has enough thermal capability to support the application at reduced speeds.

The point here is that being IGBT "Compatible" is not necessarily "Invertor Duty". Standard efficiency motors with appropriate IGBT compatible insulation have as a primary design parameter cost, not variable speed loading capability. Many simple applications can be served with these standard motors but all the parameters must be considered. Some of the most significant are:

- Thermal stress for low frequency constant torque loads
- Low frequency performance - speed oscillation
- Lead length
- System information feedback

If any of these items are necessary or unknown the user should consider the true Inverter Duty Motor.

ASD™/LOAD REQUIREMENT DATA SHEET

VARIABLE FREQUENCY OPERATION

Design Point	Hp @		RPM
Range (Min-Max)	-		RPM
Type Load Variable Torque	Constant Torque		
Above Design RPM	Constant Hp	CTq	VTq

ASD Type: _____ PWM (Pulse Width Modulated)

_____ VSI (6 Step Voltage Inverter)

_____ CSI (6 Step Current Inverter)

Make	Model #

Fill out only the applicable requirements below:

Service Factor (sine wave)	(ASD)
Temp Rise (sine wave)	(ASD)
Overload (150% for 1 minute standard):	
Overload (%) of motor required at top speed:	
Starting Torque (140% rated torque with 150% Rated Current Standard):	

LOAD CONNECTION

TYPES OF CONNECTION

Two methods of mechanical connection of the motor to the driven load are commonly used:

1. **Direct Connection**
   Direct connection should always be considered where the required load speed coincides with an available motor speed. The preferred practice is to use a flexible coupling, which will allow a slight amount of misalignment and minimize transmission of thrust to the motor bearings. Axial thrust loads are commonly encountered when a pump impeller or fan is mounted on the motor shaft. They also occur in direct connected helial gear drives and when the motor is mounted vertically or in an inclined position where any weight other than the rotor is supported by the motor shaft. Refer to Table 26 for recommended maximum axial thrust loads for horizontal ball-bearing motor with typical bearing sizes.

2. **Belt, Chain and Gear Drives**
   When connecting a motor to its load with this type of drive, proper selection is necessary to limit bearing loads within radial load capacities. Tables 27 and 28 provide recommended minimum V-belt sheave diameters for 60 and 50 HZ motors. Tables 27 and 28 indicates the approximate radial forces corresponding to a belt tightened sufficiently to prevent slippage. Additional tension will increase the radial force and decrease bearing life. For A-B-C-D-E belts, the center line of the pulley should not extend beyond the end of the shaft. For 3V-5V-8V belts, the centerline of the pulley should not be any closer to the end of the shaft than 1/2 the V dimension of the shaft.

Requests are made accordingly for parameters not labeled in these tables. Belt and sheave manufactureres and their distributers typcally provide a Load Analysis Data sheet as a technical service. Regardless of who is asked, the following information is necessary.

Table 26: Axial Thrust (pounds) for Horizontal Motors

	3600 RPM		1800 RPM		1200 RPM		900 RPM	
Frame	Bearing	Thrust	Bearing	Thrust	Bearing	Thrust	Bearing	Thrust
182-184	6206	140	6206	165	6206	220	6206	245
213-215	6307	250	6307	335	6307	375	6307	425
254-256	6309	405	6309	500	6309	670	6309	710
284-286	6310	460	6310	625	6310	770	6310	790
324-326	6210	230	6210	290	6210	395	6210	325
364-365	6213	390	6213	485	6213	630	6213	635
404-405	6313	375	6313	435	6313	590	6313	710
444-445	6314	760	6314	1040	6314	1205	6314	1400
449	6314	705	6314	965	6314	1115	6314	1325
509	6315	705	6318	1175	6318	1275	6318	1445
511	6315	680	6318	1030	6318	1290	6318	1260
513	6315	620	6320	1265	6320	1360	6320	1450

Note: Table 26 assumes no external radial loading on the shaft. Thrust values in Table 26 represent the maximum permissible to provide a 25,000 hour L_{10} life in accordance with ABMA calculations.

Table 27: Limiting Sheave Dimensions for V-Belt Drive (Frames 182T-449T)

Frame	Horsepower at Sync Speed, RPM				V-belt Sheave (inches)**				
					Conventional		Narrow		
					A, B, C, and D Sections††		3V, 5V, 8V Sections***		
60 HZ	3600	1800	1200	900	Min Pitch Dia.	Max Width Inches	Min Outside Dia.	Max Width Inches#	Belt Pull (lbs)**
182T	3.0	3.0	1.5	1.0	2.4	5.25	2.4	2.75	155
182T	5.0	-	-	-	2.6	5.25	2.4	2.75	130
184T	-	-	2.0	1.5	2.4	5.25	2.4	2.75	155
184T	5.0	-	-	-	2.6	5.25	2.4	2.75	130
184T	7.5	5.0	-	-	3.0	5.25	3.0	2.75	210
213T	7.5-10.0	7.5	3.0	2.0	3.0	6.5	3.0	3.38	310
215T	10.0	-	5.0	3.0	3.0	6.5	3.0	3.38	310
215T	15.0	10.0	-	-	3.0	6.5	3.8	3.38	355
254T	15.0	-	7.5	5.0	3.8	7.75	3.8	4.0	370
254T	20.0	15.0	-	-	4.4	7.75	4.4	4.0	425
256T	20.0-25.0	-	10.0	7.5	4.4	7.75	4.4	4.0	425
256T	-	20.0	-	-	4.6	7.75	4.4	4.0	565
284T	30.0	-	-	-	4.4	9.0	4.4	4.58	425
284T	-	-	15.0	10.0	4.6	9.0	4.4	4.58	625
284T	-	25.0	-	-	5.0	9.0	4.4	4.58	705
286T	30.0	-	-	-	4.4	9.0	4.4	4.58	425
286T	40.0	-	-	-	4.6	9.0	4.6	4.58	540
286T	-	30.0	20.0	15.0	5.4	9.0	5.2	4.58	715
324T	40.0	-	-	-	4.6	10.25	4.6	5.25	540
324T	-	40.0	25.0	20.0	6.0	10.25	6.0	5.25	825
324T	50.0	-	-	-	5.0	10.25	5.0	5.25	620
326T	50.0	-	-	-	5.0	10.25	5.0	5.25	620
326T	-	50.0	30.0	25.0	6.8	10.25	6.8	5.25	910
326T	60.0	-	-	-	5.4	10.25	5.4	5.25	690
364T	-	-	40.0	30.0	6.8	11.5	6.8	5.88	1195
364T	60.0	-	-	-	5.4	11.5	5.4	5.88	690
364T	-	60.0	-	-	7.4	11.5	7.4	5.88	1005
365T	-	-	50.0	40.0	8.2	11.5	8.2	5.88	1210
365T	-	75.0	-	-	9.0	11.5	8.6	5.88	1080
404T	-	-	60.0	-	9.0	14.25	8.0	7.25	1395
404T	-	-	-	50.0	9.0	14.5	8.4	7.25	1475
404T	-	100.0	-	-	10.0	14.25	8.6	7.25	1440
405T	-	-	75.0	60.0	10.0	14.25	10.0	7.25	1485
405T	-	100.0	-	-	11.5	14.25	8.6	7.25	1440
405T	-	125.0	-	-	11.0	14.25	10.5	7.25	1475
444T	-	-	100.0	75.0	10.5	16.75	10.0	8.5	1770
444T	-	-	-	-	11.0	16.75	9.5	8.5	1995
444T	-	125.0	-	-	-	16.75	9.5	8.5	1630
444T	-	150.0	-	100.0	12.5	-	10.5	8.5	1770
445T	-	-	125.0	-	12.5	16.75	12.0	8.5	1935
445T	-	-	-	-	-	16.75	12.0	8.5	2065
445T	-	150.0	-	-	-	-	10.5	8.5	1770
445T	-	200.0	-	-	-	-	13.2	8.5	1875
445T	-	-	150.0	-	-	-	13.5	8.5	2065
449T	-	-	200.0	-	-	-	18.475	8.5	1980
449T	-	-	-	150.0	-	-	169.0	8.5	1955
449T	-	-	-	200.0	-	-	27.75	8.5	1785
449T	-	250.0	-	-	-	-	15.5	12.75	1995

* For the maximum speed of the drive components, see NEMA MG-1-Part 14 Section 14.7.3.

† For the assignment of horsepower and speed ratings to frames, see NEMA Part 13.

**Sheave dimensions are based on the following:

A. Motor nameplate horsepower and speed
B. Belt service factor of 1.6 with belts tightened to belt manufacturers' recommendations
C. Speed reduction of 5:1
D. Mounting of sheave on motor shaft in accordance with NEMA MG-1-Part 14 Section 14.7
E. Center-to-center distance between sheaves approximately equal to the diameter of the larger sheave
F. Calculations based upon standards covered by the †† and *** footnotes, as applicable

The width of the sheave shall be no greater than that required to transmit the indicated horsepower but in no case shall it be wider than 2(N-W) -0.25.

*** As covered by Standard Specifications for Drives Using Narrow V-Belts (3V, 5V, and 8V).

The width of the sheave shall be not greater than that required to transmit the indicated horsepower but in no case shall it be wider than (N-W).

†† As covered by Engineering Standards Specifications for Drives Using Multiple V-Belts (A,B,C, and D Cross Sections) See 1.1, The Rubber Manufacturers Association.

Table 28: Limiting Sheave Dimensions for V-Belt Drive Typical 500 Frame Data

Dripproof					
Horsepower @ RPM					
1800	1200	900	Bearing Construction	Min. Sheave Dia. (in)	Belt Pulls (lbs)
-	-	150	(1)	16.5	2200
-	-	200	(2)	9	5500
-	-	250	(2)	17	3600
-	250	-	(2)	9	5200
-	300	-	(2)	15	3700
300	-	-	(2)	7.5	4900
350	-	-	(2)	13.5	3200
TEFC Motors					
-	-	125	(1)	14.5	2100
-	-	150	(1)	18	2100
-	-	-	(2)	13	3800
-	200	-	(1)	18	2100
-	250	-	(2)	15	3100
-	250*	-	(2)	10.5	4400
-	-	-	(1)	17.5	1800
-	-	-	(2)	9	4100
-	-	-	(2)	11.5	3800

* for 5011L frame size

(1) Deep groove ball-bearing construction

(2) Special shaft materials and roller-bearing construction

Notes:

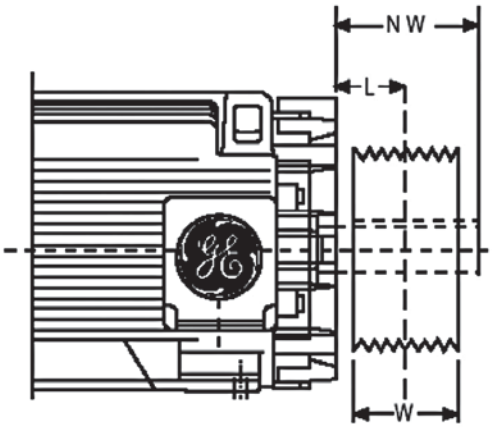
1. Minimum bearing life, L_{10}, for a given sheave diameter is 25,000 hours
2. The recommended sheave diameters are based on a 5:1 speed reduction and a sheave center-to-center distance approximately equal to the diameter of the larger sheave.

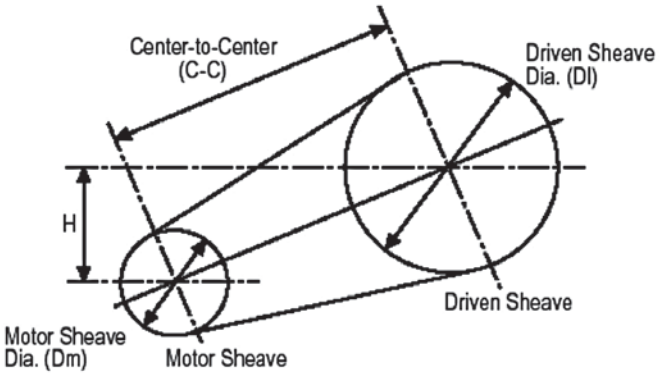
CAUTION: BELT SPEEDS IN EXCESS OF 6500 FEET PER MINUTE MAY REQUIRE SPECIAL SELECTION OF DRIVE COMPONENTS. MOTOR USER SHOULD GET SPECIFIC APPROVAL FROM BELT AND SHEAVE SUPPLIER FOR SUCH APPLICATIONS.

LOAD CALCULATIONS

Belt Driven Application Analysis

Belt and Sheave Manufacturers and their distributors typically provide a Load Analysis Data Output Sheet to the end user/OEM as a technical service. When requesting a quotation, Emporium Energy suggests the Load Analysis Data Output Sheet be provided in addition to this form for a complete motor shaft and bearing analysis.





End User:		
Application information (e.g. fan, pump, crusher):		
Type of Driven Load (e.g. variable torque, constant torque, constant horsepower):		
Motor Rating - **Required**		
Horsepower:	Frame Size:	Speed:
Motor Enclosure: Voltage:		
Shaft Orientation (e.g. horizontal, vertical shaft up, vertical shaft down):		
Belt information - **Required**		
Distance between face of motor endshield and center line of motor sheave width (L):		
Inertia of driven load referred to the motor shaft (lb-ft^2) (required for centrifuge):		
The following is not required when a Load Analysis Data Output sheet is provided:		
Option A		
Motor sheave pitch diameter (Dm):		
Driven sheave pitch diameter (DI):		
Center-to-center distance between sheaves (C-C)		
Motor shaft height vs. driven shaft (H):		
Width of motor sheave (W):		
Weight of motor sheave (lbs):		
Belt service factor:		
Belt Type (e.g. 5V, 3VX): Number of belts:		
Option B		
Radial Load/Belt Pull (lbs):		

This page must be completed for:
A. 720 RPM and slower motors (10 or more poles)
B. 447T and larger frame sizes
C. Non-standard L_{10} values
D. Customer requests

MECHANICAL MODIFICATIONS

BEARING - TEMPERATURE DETECTORS

BTD's are used to measure the temperature of bearings; these are precision, wire-wound resistors with a known temperature resistance characteristic. In operation, the BTD is usually wired into a specific type of circuit (Wheatstone bridge). The output of this circuit can be used to drive a meter, which has been calibrated, in temperature, or to operate a relay to sound an alarm or shut down the motor. These devices are available on 320-5013 frame motors.

BTD's are constructed using a fine, pure, metallic, spring-like wire surrounded by an insulator and enclosed in a metal sheath.

- 120 Ohm Nickel
- 100 Ohm Platinum
- 10 Ohm Copper

BEARING THERMOCOUPLE

A thermocouple is constructed of two dissimilar wires joined at one end and encased in a metal sheath that an electro-motive force (EMF) is developed by the thermoelectric effects. Any given set of thermocouple wires have a known "EMF vs. Temperature" characteristic. The other end of each wire is connected to a meter or measuring circuit. Heating the measuring junction of the thermocouple produces a voltage that is greater than the voltage across the reference junction. The difference between the two voltages is proportional to the difference in temperature and can be measured on a voltmeter.

Thermocouples are classified based on the materials used for joints, examples are:

Iron Constantan	-	Type J
Chromel Constantan	-	Type E
Copper Constantan	-	Type T
Chromel Alumel	-	Type K

BEARING LIFE

L_{10} life is the basic rating life expressed in millions of revolutions or number of operating hours at 90% reliability. The bearing life, in hours for 90% reliability, for anti-friction bearings expressed as:

$$L_{10} = \frac{1000000}{60*RPM} * (C/P)^n$$

Where:
RPM = rotation speed
C = bearing dynamic capacity
P = equivalent radial load
n = 3 for ball bearing and 10/3 for roller bearing

L_{10a} life is the rating life expressed in millions of revolutions or number of operating hours considering life adjustment factors for reliability, material and operating conditions.

L_{10a} life = a1*a2*a3*L_{10}
Where: a1 = adjustment factor for reliability
a2 = adjustment factor for bearing materials
a3 = adjustment factor for bearing operating conditions including adequacy of lubrication, cleanliness, temperature etc.

Generally a2 and a3 factors are combined and called as a23 - Combined Life Adjustment Factor.

BRAKES

Brakes supplied mounted on motors will be disc-type, spring set electrically released brakes manufactured by Stearns Electric Corp. at General Electric Company option. Brakes are available for motors in frames 143-445 only.

Several factors must be considered when determining the correct brake for a particular application.

Refer to Emporium Energy for 'frames above 445' and 'Special brakes like Drum-Shoe/ Floor-mounted'.

1. **Brake Torque**
   As a general rule of thumb, the torque rating of a brake should, as a minimum, match the full-load torque of the motor on which it is mounted. This will provide ample torque if the brake is used for holding and will also provide a stop in approximately the same time as required for acceleration. Full-load torque can be calculated as follows:

$$\text{Full-Load Torque} = \frac{5252 \times Hp}{\text{Full-load Speed}}$$

   For applications involving high inertia load, fast stops or a stop within a given time limit, the brake should be selected on the basis of total inertia to be retarded. Brake rating may be calculated as follows:

$$\text{Torque} = \frac{WK^2 \times RPM}{308 \times t}$$

   Where:
   WK^2 = Load inertia in lb-ft²
   RPM = Full-Load Speed in RPM
   t = Time, in seconds, to stop

   Standard brake torque ratings or continuous duty include: 6, 10, 15, 25, 35, 50, 75, 105, 125, 175, 230, 330, 440, 550 lb-ft. If the calculated brake torque falls between the standard torque values, specify the next higher torque.

2. **Brake Voltage**
   Brakes are supplied for operation on the same voltage as the motor unless otherwise specified. In the case of dual voltage motors, brake voltage will be the lower of the motor voltages, unless otherwise specified. Standard brake voltages are:

   60 HZ: 200, 230, 460, 575 volts
   50 HZ: 200, 220, 380, 415, 440, 550 volts

   Stearns brakes are all single-phase.

   Brake leads are terminated at a conduit connection on the brake.

3. **Brake Enclosure**
   Brakes are available in enclosures to match the needs of the environment in which they will be operating. Standard enclosure is for application on dripproof or totally-enclosed fan-cooled motors for indoor or semi-protected outdoor installations. Dust-tight, waterproof enclosure is suitable for severe-duty and totally-enclosed motors used in conditions of extreme moisture, abrasive or conductive dusts, acid or alkali fumes or for outdoor installation.

4. **Vertical Mounting Position**
   Brakes must be specially modified for vertical mounting. Specify if the motor will be above or below the brake.

CONDUIT BOX, SPECIAL

Standard conduit boxes meet or exceed NEMA and NEC volumes and are adequate for connecting all necessary leads for power and any incidental control circuits.

Available options for motors in frames 182 through 449 include extra 3/4 inch conduit hole for dripproof, TENV and TEFC motors, additional conduit box, waterproof conduit box and oversized box.

Motors in frames 509-5013 are available with a 2500 cubic inch motor mounted box suitable for stress cone connections or for mounting accessory equipment. This special box is furnished as standard for all motors of 3000 volts and above. Three stand-off insulator-supported copper bar terminations for motor leads can be furnished. An 11,000 and a 17,000 cubic inch motor mounted conduit box are available. In addition, a 44,000 cubic inch floor mounted, conduit box is available to mount beside the motor with conduit connection to the motor frame. This construction allows the customer to mount accessories such as current transformers, surge capacitors, lightning arrestors, etc.

315 frame IEC conduit boxes are cast iron or fabricated steel depending on the size of the box. The box is severe duty, with lead gasket and ground terminal. Motors up to 690 volt will have a terminal block, above 690 volt will have standoff terminals.

COUPLINGS

Motors are normally furnished without couplings; however, a one-piece half coupling can be installed on the motor shaft at the factory providing it is balanced, finished machined and key-seated to motor shaft dimensions. It must be shipped prepaid to the factory of motor manufacturer before the start of production. Motors are dynamically balanced prior to installing the half coupling and are not rebalanced after coupling assembly.

A vibration test with half-coupling installed will be performed and a test report issued when this special service is requested by the customer and included in the quotation.

DOWEL HOLES IN FEET

Dowel holes are furnished as standard on 500 frame motors as an alignment aid. One 1/2 inch hole is provided in each of the diagonally opposite feet.

ENDSHIELDS, SPECIAL

Horizontal motors are available with C-face, and D-flange endshields, which have rabbets and bolt holes for mounting equipment to the motor, or for overhanging the motor on a driven machine. The C-face endshield provides a male rabbet and tapped holes for mounting bolts. This endshield is used for mounting small apparatus, such as pumps, to the motor. The D-flange has a male rabbet, with holes in the flange for through bolts. This flange is primarily used on machine-tool gear boxes and compressors.

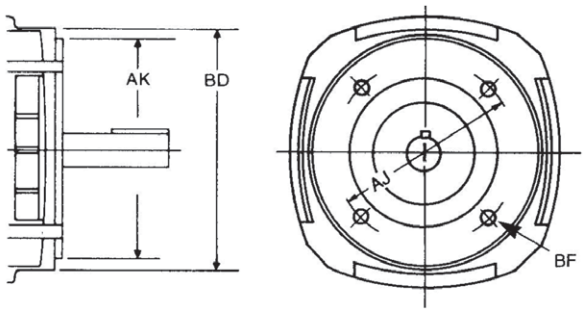


Figure 29: Type C-Face

Table 29: C-Face Mounting Dimensions (inches)

Dimension in inches					
NEMA Frame Size	Frame Diameter	Rabbet Diameter	Bolt Circle	Bolt Holes	
				BF	
	BD	AK	AJ	Tap Size	Min. Depth
182-184	9.00	8.50	7.25	.50-13	0.88
213-215	8.68	8.50	7.25	.50-13	0.88
254-256	8.68	8.50	7.25	.50-13	0.88
284-286	10.75	10.50	9.00	.50-13	0.88
324-326	12.75	12.50	11.00	.625-11	1.06
364-365	13.00	12.50	11.00	.625-11	1.06
404-405	13.00	12.50	11.00	.625-11	1.06
444-449	13.00	12.50	14.00	.625-11	1.06
500	18.00	16.50	14.50	.625-11	1.06

Note: Frames 180 through 326 have 4 holes; 364 and larger have 8 holes.

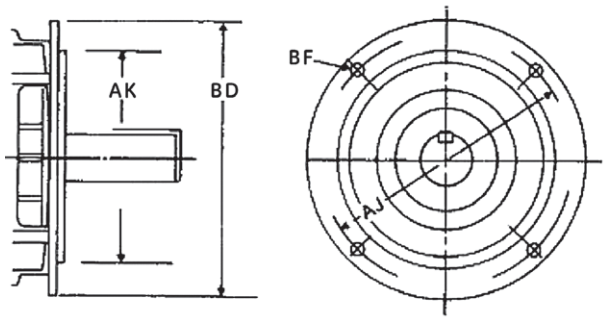


Figure 30: Type D-Flange

Table 30: D-Flange Mounting Dimensions (inches)

Dimension in inches				
NEMA Frame Size	Face Diameter	Rabbet Diameter	Bolt Circle	Bolt Holes
	BD	AK	AJ	BF
182-184	11.00	9.00	10.00	0.53
213-215	11.00	9.00	10.00	0.53
254-256	14.00	11.00	12.50	0.81
284-286	14.00	11.00	12.50	0.81
324-326	18.00	14.00	16.00	0.81
364-365	18.00	14.00	16.00	0.81
404-405	21.90	18.00	20.00	0.81
444-449	21.94	18.00	20.00	0.81
500	25.00	18.00	22.00	0.81

Note: Frames 182 through 365 have 4 holes. 404 and larger have 8 holes.

C-face and D-flange kits are available for field modification of standard motors by an Authorized GE Service center. These kits are provided as a convenience item. These modified motors will not meet NEMA BA dimensions and there is some loss in usable shaft length.

FRAME, NON-STANDARD

Requests are occasionally received to furnish motors in frame sizes either larger or smaller than NEMA standard. If frame size is larger than standard it is to be supplied, the standard motor rating for the frame size that will be furnished. If smaller than standard frame is required, please contact Emporium Energy for feasibility and terms.

GREASE AND RELIEF FITTINGS

Motors with regreasable bearing systems can be supplied with regrease fittings and automatic grease relief devices. Severe-duty motors are supplied with extended hydraulic grease fittings and plugs.

SHAFTS, SPECIAL

Motors are furnished with a single straight shaft with sled runner keyway and a rectangular key. For motors in frames 182 through 449, a long shaft for V-belt drive is supplied for a majority of ratings and is denoted by the suffix “T” or “L” on the motor frame size. Two-pole (3600 RPM) motors in frames 284 through 449 and certain other 449 frame ratings are furnished with short shafts for direct connection. These motors are denoted with the suffix “TS”, “LL” or “LS” on the motor frame size. Standard double-end shaft extensions are available for motors in frames 143 through 5011. Special shaft designs are available including differences in dimensions and/or materials as follows:

Length: Up to 10 inches longer than standard for motors in frames 182-449

Up to 13 inches longer than standard for motors in frames 509-5013
Longer than standard shafts are usually suitable for direct connection. Other drives such as belts or gearing may require special bearings and should be referred to Emporium Energy.

Keyway: Sled-runner, round end, or Woodruff #3 or #9

Hole: Drilled radially or in the end of the shaft. Drilled and tapped in the end of the shaft. Hole depth limited to three times the hole diameter 26.

Steps: One or more reductions in shaft diameter.

Threads: Class 2A right-hand thread size appropriate to the shaft diameter.

Squared: Milled flats on four sides of one step.

Tapered: 1- 1/4 or 1- 1/2 inch per foot taper with threads, nut and lock washer.

SHAFT SLINGER

A steel reinforced neoprene shaft slinger is an elastomer ring disc mounted on the shaft. It reduces the probability of the contamination of the bearing system when the shaft is rotating. (Not available on explosion proof). Shaft slinger is standard on drive end for all Severe Duty motors and on both ends on XSD Ultra® motors (except C-face and D-flange, for 140-180 frames).

Shaft Grounding Ring (SGR)

The shaft grounding ring prevents electrical bearing damage by safely channeling harmful shaft voltages away from the bearings to ground.

The specially engineered conductive micro fiber of the AEGIS grounding ring used in GE motors provides a path of least resistance for damaging bearing currents and extends motor bearing life. The shaft grounding ring is offered as an externally mounted option on the Energy Saver® ODP and TEFC motor products, and DC products, using a specially designed mounting bracket. The shaft grounding ring is offered as an internal mount option on XSD Ultra® motors and ASD motors.

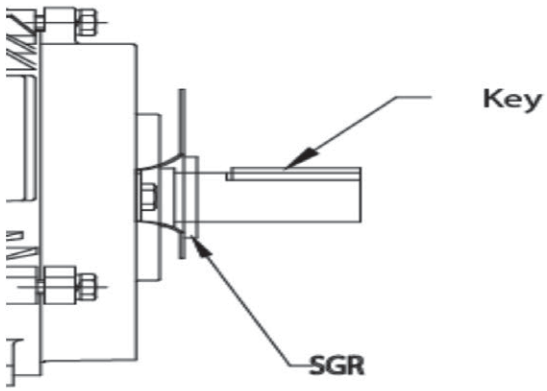


Figure 31

TACHOMETER

Tachometer and encoder are terms used for equipment that has an output signal indicating the motors speed. The degree of sophistication is diverse - ranging from a DC voltage proportional to speed, to dual output frequency pulses, up to a few thousand pulses per revolution (PPR). It can be used to indicate not only velocity, but also acceleration and position when used in association with equipment to interpret the signals.

TACHOMETER OR ENCODER MOUNTING PROVISION

For mounting a C-face tachometer, the motor is supplied with an 8.5” C-face mounting rabbet on the opposite drive end with a stub shaft. Customer is to provide; the ‘stub shaft dimensions’, ‘manufacturer’ and ‘style’ of device to be mounted, with order.

For mounting a tether tachometer, the motor is supplied with opposite drive end shaft extension and a hole drilled and tapped in the fan cover/endshield to secure the anti-rotation device. Customer is to provide; ‘detailed shaft dimensions’, ‘manufacturer’ and ‘type’ of the tachometer device.

NOTE: Tachs available through mod-shop, see Section MM.

VERTICAL JACK SCREWS

Vertical jack screws are used during alignment of the motor and drive equipment. The jack screw is used as an aid to insert the proper shims. Vertical jack screws are NOT intended as permanent support of the motor. Proper shimming and bolting of the motor to the base must be completed and tension removed from the jack screws.

VIBRATION DETECTION

Motors can be provided with vibration switch or vibration detection probes/transmitters or with only provisions for vibration probes.

VIBRATION SWITCH

Provided with SPDT switch which disconnects the motor power circuit when the motor vibration level exceeds the set vibration limit.

VIBRATION PROBES/TRANSMITTERS

This transmits electrical signal (mA) proportional to velocity or displacement, directly to PLC or DCS or any other vibration monitor.

These are generally mounted on the endshields, above the bearings. When it is not feasible to mount on the endshields, they can be mounted on the frame, close to the endshields.

MOTOR TESTING

Good motor application practice requires that uniform and meaningful terminology be used to define efficiency values which are determined by accurate test procedures uniformly applied by the motor manufacturers.

Testing to accurately determine the value of motor losses can be time consuming and expensive. Also, wide variations in results can be experienced when different test methods are used. In order to maintain consistency, NEMA has established the following guidelines:

Efficiency and losses shall be determined in accordance with latest revision of IEEE standard 112 or CSA C390. Polyphase squirrel-cage motors rated 1-500 Hp shall be tested by dynamometer. The efficiency will be determined using segregated losses in which stray load loss is obtained from linear regress ion analysis to reduce the effect of random errors in the test measurements.

This procedure focuses on stray load losses where the greatest variance can occur from one motor to the next. It also clearly defines the procedure and requires testing either at full operating temperature or by making corrections for temperature differences. Finally, the test method requires use of a dynamometer to provide the most accurate data as a basis for accuracy improvement and stray load loss measurement.

Motor efficiency is not an absolute or constant for all motors of the same design. Rather, the efficiencies of a large number of motors will fit a distribution as shown in Figure 32. Though Figure 32 illustrates a normal distribution, in reality the distribution **need not be** normal.

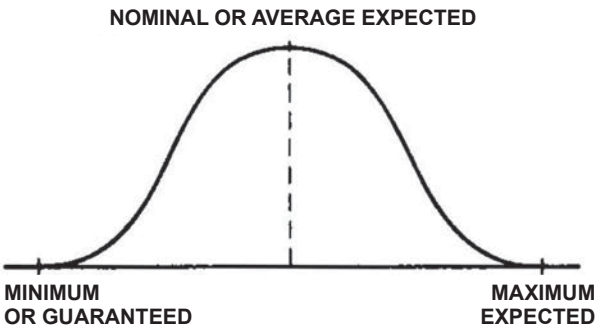


Figure 32: Efficiency distribution

The nominal efficiency which appears on the motor nameplate corresponds to the nominal, or average expected efficiency on the curve. The guaranteed minimum efficiency appearing on GE energy efficient motor nameplates corresponds to the minimum, or guaranteed on the curve.

It is to be noted that there is difference in calculation between NEMA and IEC, the same is illustrated by the table below:

Table 31: Comparison of Methodology for Efficiency Calculation between IEC and NEMA

Parameters	IEC	NEMA
Standards	IEC 60034-2	IEEE-112 Method B
Rotor I^2R loss or slip loss	No temperature correction	Temperature correction to Winding temperature
Stray load loss	0.5% of input*	Measured **
Input	Measured	Measured
Output	Calculated by subtracting the losses from input	Calculated from measured Torque

* 0.5% of input; for a motor

** Calculated stray loss is smoothed by regression analysis; output is corrected.

PLUG REVERSAL TESTING

This is an accelerated life test to evaluate the integrity of the construction and materials for the insulation system of the motor. “Plugging” is rapid braking of the motor brought about by suddenly reversing two of the three phases of the supply voltage while it is rotating in any direction. This ‘plugging’ action subjects the motor winding to severe electromagnetic forces and consequent mechanical stresses.

The test consists of subjecting the motor to several thousands of plugging and reversals. At the end of the test, the motor must be operable and successfully pass the standard insulation inspecting requirements and has exceeded the compiled historical data. Figure 33, show the Plug-reversal historical data for a 4-pole motor.

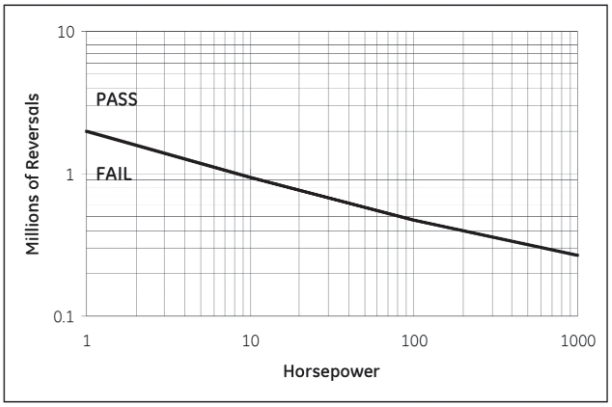


Figure 33: 4-pole GE motor test results data for minimum number of plug-reversals.

It is to be noted that for the subject test motor is equipped with special grease and or bearings. If need arises, the bearing system of the test motor, is overhauled.

CORONA INCEPTION VOLTAGE (CIV)

The CIV is the voltage at which partial discharges begin occurring within small voids inherent in any insulation system, for random winding which id fed by IGBT drive. When the voltage stress across these voids reaches the CIV, a discharge of energy takes place. These partial discharges can cause degradation of the insulation system through both chemical and mechanical erosion. Clearly, if a motor is operating continuously at a level of voltage stress above its CIV, insulation degradation occurs and eventually leads to motor failure.

CIV can be controlled:

1. Externally by:
   - Introducing power conditioning accessories like filters, reactors and isolation transformers.
   - Restricting the distance (lead length), between the motor and drive.
2. Internally by:
   - Eliminating small air spaces where corona could develop.
   - Making the space between conductors sufficiently long, so that a 2000 volt spike; cannot cause a partial discharge.
   - Advanced PWM control techniques are being developed to reduce the maximum spike voltage from 3 times to 2 times of DC voltage.

Effects of CIV, depend on construction and process adopted during manufacturing; few are listed below:

1. **Winding:** CIV improves if the beginning turn and ending turn are not in close proximity
2. **Varnish and Resin:** CIV improves with the increase in number of ‘dip and bake’ or ‘VPI’ system or excellent varnish impregnation through trickle-treat.
3. **Phase Paper:** Introduction of phase paper between the different phases, improves CIV, which are a standard feature for GE’s Polyphase motors.

AMBIENT

As a standard offering, GE motors are rated for maximum ambient of +40°C. For high and low ambient, refer to page TR.47.

GE stock XSD Ultra® motors, generally are rated for dual ambient, as follows:

At ambient 40°C, Class H with temperature rise limited to 80°C at 1.0 Service Factor and suitable for 1.25 Service Factor with 115°C rise. Alternatively these motors are suitable for operation in a 65°C ambient with 105°C rise, at 1.0 Service Factor.

III. EFFICIENCY

DEFINITION

Efficiency is an important application consideration. This is especially true for applications having high hours of operation where cost of motor operation is many times the initial purchase price of the motor.

As shown below, efficiency is defined as watts output over watts input using 746 watts as the equivalent of one horsepower:

$$\text{Efficiency} = \frac{746 \times \text{Hp Output}}{\text{Watts Input}} = \frac{\text{Watts Output}}{\text{Watts Input}}$$

This can also be expressed as the watts input minus the losses divided by the watts input.

$$\text{Efficiency} = \frac{\text{Input - Losses}}{\text{Input}}$$

The only way to improve efficiency is to reduce losses. Although input power is readily measured, power out is difficult to measure accurately. Therefore, precision equipment is required to determine the efficiency and the losses in a motor. Standard test procedures are defined to measure the individual components of loss separately in order to improve the accuracy of efficiency determination.

DESCRIPTION OF MOTOR LOSSES

Typically, motor losses are categorized, first, as those which occur while the motor is energized but operating at no-load; and, second, those additional losses due to the output load. Specific losses are:

1. No-load losses
   a. Windage and friction
   b. Stator iron losses
   c. Stator I^2R losses
2. Load Losses
   a. Stator I^2R losses (due to increase in current under load)
   b. Rotor I^2R
   c. Stray load losses

The no-load losses and the conductor losses under load can be measured separately; however, the stray load loss requires accurate input-output test equipment for determination. The stray-load loss consists of losses due to harmonic currents and flux in the motor. Factors affecting stray load losses include:

- Stator and rotor slot geometry
- Number of slots
- Air gap length
- Rotor slot insulation
- Manufacturing process

PREMIUM EFFICIENCY

GE Premium Efficiency motors exceed or meet the NEMA Premium Efficiency (except for special motors like Vertical High Thrust motors, Etc.) as stated in the table:

Table 32: NEMA Premium Efficiency Nominal Level; Reference Table 12-12 NEMA (MG-1)

Motor Hp	Enclosed Motors			Open Motors		
	2 Pole	4 Pole	6 Pole	2 Pole	4 Pole	6 Pole
1	77	85.5	82.5	77	85.5	82.5
1.5	84	86.5	87.5	84	86.5	86.5
2	85.2	86.5	88.5	85.5	86.5	87.5
3	86.5	89.5	89.5	85.5	89.5	88.5
5	88.5	89.5	89.5	86.5	89.5	89.5
7.5	89.5	91.7	91	88.5	91	91.2
10	90.2	91.7	91	89.5	91.7	91.7
15	91	92.4	91.7	90.2	93	91.7
20	91	93	91.7	91	93	92.4
25	91.7	93.6	93	91.7	93.6	93
30	91.7	93.6	93	91.7	94.1	93.6
40	92.4	94.1	94.1	92.4	94.1	94.1
50	93	94.5	94.1	93	94.5	94.1
60	93.6	95	94.5	93.6	95	94.5
75	93.6	95.4	94.5	93.6	95	94.5
100	94.1	95.4	95	93.6	95.4	95
125	95	95.4	95	94.1	95.4	95
150	95	95.8	95.8	94.1	95.8	95.4
200	95.4	96.2	95.8	95	95.8	95.4
250	95.8	96.2	95.8	95	95.8	95.4
300	95.8	96.2	95.8	95.4	95.8	95.4
350	95.8	96.2	95.8	95.4	95.8	95.4
400	95.8	96.2	95.8	95.8	95.8	95.8
450	95.8	96.2	95.8	95.8	96.2	95.2
500	95.8	96.2	95.8	95.8	96.2	95.2

The “minimum guaranteed efficiency,” below nominal value:

1. Per NEMA is 2 bands -OR (as applicable)
2. Per EISAct 2007 law requires the motor losses to be no more than 15% lower than namplate. Referred to the federal registry 10 CFR Part 431, and section 431.24.

GE’s XSD Ultra® family of products, offers ‘minimum guaranteed efficiency’ at 1 band below the nominal value.

Comparison, of ‘1-band low’; for minimum guaranteed efficiency levels (Per NEMA).

Table 33: Comparison of Minimum Guaranteed Efficiency Levels

Nominal Value	Minimum Guaranteed Efficiency	
	1-band	2-band
98.6	98.5	98.4
98.5	98.4	98.2
98.4	98.2	98.0
98.2	98.0	97.8
98.0	97.8	97.6
97.8	97.6	97.4
97.6	97.4	97.1
97.4	97.1	96.8
97.1	96.8	96.5
96.8	96.5	96.2
96.5	96.2	95.8
96.2	95.8	95.4
95.8	95.4	95.0
95.4	95.0	94.5
95.0	94.5	94.1
94.5	94.1	93.6
94.1	93.6	93.0
93.6	93.0	92.4
93.0	92.4	91.7
92.4	91.7	91.0

Nominal Value	Minimum Guaranteed Efficiency	
	1-band	2-band
91.7	91.0	90.2
91.0	90.2	89.5
90.2	89.5	88.5
89.5	88.5	87.5
88.5	87.5	86.5
87.5	86.5	85.5
86.5	85.5	84.0
85.5	84.0	82.5
84.0	82.5	81.5
82.5	80.0	81.5
81.5	80.0	78.5
80.0	78.5	77.0
78.5	77.0	75.5
77.0	75.5	74.0
75.5	74.0	72.0
74.0	72.0	70.0
72.0	70.0	68.0
70.0	68.0	66.0
68.0	66.0	64.0
66.0	64.0	62.0

IEC EFFICIENCY LEVELS

More information can be found out, when IEC publishes and releases the IEC Standard IEC 60034-30.

NOTE: Table 34 indicates the Nominal values being proposed for Premium Efficiency (IE3) levels. The values could be changed when the standard is released by IEC.

Table 34: IEC Efficiency Levels for IE1, IE2, IE3 and IE4 for 50 HZ

Motor Rating	% Efficiency											
	2 Pole				4 Pole				6 Pole			
kW	IE1	IE2	IE3	IE4	IE1	IE2	IE3	IE4	IE1	IE2	IE3	IE4
0.75	72.1	77.4	80.7	84.9	72.1	79.6	82.5	85.6	70.0	75.9	78.9	83.1
1.1	75.0	79.6	82.7	86.7	75.0	81.4	84.1	87.4	72.9	78.1	81.0	84.1
1.5	77.2	81.3	84.2	87.5	77.2	82.8	85.3	88.1	75.2	79.8	82.5	86.2
2.2	79.7	83.2	85.9	89.1	79.7	84.3	86.7	89.7	77.7	81.8	84.3	87.1
3	81.5	84.6	87.1	89.7	81.5	85.5	87.7	90.3	79.7	83.3	85.6	88.7
4	83.1	85.8	88.1	90.3	83.1	86.6	88.6	90.9	81.4	84.6	86.8	89.5
5.5	84.7	87.0	89.2	91.5	84.7	87.7	89.6	92.1	83.1	86.0	88.0	90.2
7.5	86.0	88.1	90.1	92.1	86.0	88.7	90.4	92.6	84.7	87.2	89.1	91.5
11	87.6	89.4	91.2	93.0	87.6	89.8	91.4	93.6	86.4	88.7	90.3	92.5
15	88.7	90.3	91.9	93.4	88.7	90.6	92.1	94.0	87.7	89.7	91.2	93.1
18.5	89.3	90.9	92.4	93.8	89.3	91.2	92.6	94.3	88.6	90.4	91.7	93.5
22	89.9	91.3	92.7	94.2	89.9	91.6	93.0	94.7	89.2	90.9	92.2	93.9
30	90.7	92.0	93.3	94.0	90.7	92.3	93.6	95.0	90.2	91.7	92.9	94.3
37	91.2	92.5	93.7	94.8	91.2	92.7	93.9	95.3	90.8	92.2	93.3	94.6
45	91.7	92.9	94.0	95.1	91.7	93.1	94.2	95.6	91.4	92.7	93.7	94.9
55	92.1	93.2	94.3	95.4	92.1	93.5	94.6	95.8	91.9	93.1	94.1	95.2
75	92.7	93.8	94.7	95.6	92.7	94.0	95.0	96.0	92.6	93.7	94.6	95.4
90	93.0	94.1	95.0	95.8	93.0	94.2	95.2	96.2	92.7	94.0	94.9	95.6
110	93.3	94.3	95.2	96.0	93.3	94.5	95.4	96.4	93.3	94.3	95.1	95.6
132	93.5	94.6	95.4	96.0	93.5	94.7	95.6	96.5	93.5	94.6	95.4	95.8
180	93.8	94.8	95.6	-	93.8	94.9	95.8	*	93.8	94.8	95.6	*
200 up to 375	94.0	95.0	95.8	*	94.0	95.1	96.0	*	94.0	95.0	95.8	*

*Other efficiency levels are indicated for specific motor ratings in IEC 60034-30

Table 35: Indicative Values (%) of IEC Premium Efficiency (IEC) for 50 HZ

kW	Hp	2 Pole	4 Pole	6 Pole
0.75	1	82.1	84	80.6
1.1	1.5	83.8	85.3	82.4
1.5	2	85.1	86.3	83.8
2.2	3	86.4	87.5	85.4
3	4	87.5	88.4	86.6
4	5.4	88.4	89.2	87.7
5.5	7.4	89.4	91	88.7
7.5	10	90.3	91.8	89.7
11	15	91.2	91.7	90.8
15	20	91.9	92.3	91.6
18.5	25	92.4	92.7	92.1
22	30	92.7	93.1	92.5
30	40	93.3	93.6	93.1
37	50	93.7	94	93.5
45	60	94	94.3	93.9
55	74	94.3	94.5	94.2
75	100	94.7	95	94.7
90	120	95	95.2	94.9
110	150	95.2	95.4	95.2
132	175	95.4	95.6	95.4
160	210	95.6	95.8	95.6
200 & above	265 & above	95.8	96	95.8

1. Pre-EPAct: DOE's MotorMaster+ software version 4.00.01 (9/26/2003) "Average Standard Efficiency" motor defaults
2. EPAct: Energy Policy Act of 1992
3. NEMA Premium: NEMA MG-1 Table 12-12

Table 36: Comparison of Efficiency Levels (Pre-EPAct/ EPAct/ Premium) for 4-pole Totally Enclosed Motors for 60 HZ

Size (Hp)	Pre-EPAct[1]	EPAct[2]	NEMA Premium[3]
1	76.7	82.5	85.5
1.5	79.1	84	86.5
2	80.8	84	86.5
3	81.4	87.5	89.5
5	83.3	87.5	89.5
7.5	85.5	89.5	91.7
10	85.7	89.5	91.7
15	86.6	91	92.4
20	88.5	91	93
25	89.3	92.4	93.6
30	89.6	92.4	93.6
40	90.2	93	94.1
50	91.3	93	94.5
60	91.8	93.6	95
75	91.7	94.1	95.4
100	92.3	94.5	95.4
125	92.2	94.5	95.4
150	93	95	95.8
200	93.5	95	96.2
250	94.2	95	96.2
300	94.4	95.4	96.2
350	94.6	95.4	96.2
400	94.8	95.4	96.2
450	94.9	95.4	96.2
500	94.9	95.8	96.2

SIMPLE PAY BACK CALCULATIONS

The most important factor to consider when deciding for replacement of a motor is the pay back period.
A = per unit Load = (% load / 100%)
B = Annual usage in terms of number of hours
C = Electricity cost per kWh in $

If efficiency of the existing motor + (Eff_{old}) in % terms and Efficiency of the new motor = (Eff_{new}) in % terms.

Savings = Hp x 0.746 x A x B x C x $\left[\frac{100}{(Eff_{old})}\right] - \left[\frac{100}{(Eff_{new})}\right]$

Cost difference of Motor = (Cost for Premium Eff. Motor) - (Cost for Low Eff. Motor)
Where "cost for Low Eff. Motor" could be; an old running motor = 0
Or replacement for a failed motor = Cost of competitor motor

Pay back (in years) = (Cost difference of motor) / (Savings)

To illustrate the benefit annual savings for XSD Ultra, over competitor motor (considering minimum guaranteed efficiencies); under the following condition:

A = per unit load = 75% / 100% = 0.75
B = annual usage = 7200 hours
C = Electricity cost per kWh = 0.09¢
Hp = 20 Hp
Pole = 4

Savings = 20 x 0.746 x 0.75 x 7200 x 0.09 x $\left[\frac{100}{91.7}\right] - \left[\frac{100}{92.4}\right]$

Annual Savings = $59.90

To illustrate the pay back period, to replace a 15 year old running 20 Hp 4 -pole motor with a Premium Efficiency motor, under the following operating conditions:

A = per unit load = 75% / 100% = 0.75
B = Annual usage = 7300 hours
C = Electricity cost per kWh = 0.09¢

If Cost for Premium Eff. Motor = XSD Ultra® Price = $1125.00

Refer to Table 31; to compare and note the efficiency level; from which we can arrive at:

Eff_{old} = 88.5%
Eff_{new} = 93%

Savings = $401.96

Cost difference of Motor = $1125.00 - 0 = $1125.00

Pay back in years = $1125.00 / $401.96
= 2.8 years

A pay-back period less than 3 years, is recommended for replacement.

IV. CLASSIFICATIONS/ ENVIRONMENT

ENVIRONMENTAL CONSIDERATIONS

Motor Enclosures
The type of enclosure required is dependent upon the surrounding atmosphere in which the motor is installed and the amount of mechanical protection and corrosion resistance required. The two general classes of motor enclosure are open and totally-enclosed. An open machine is one having ventilating openings which permit passage of external air over and around the winding of the motor. A totally-enclosed machine is constructed to prevent the free exchange of air between the inside and outside of the motor, but not sufficiently enclosed to be termed air-tight.

Derivatives of these two basic enclosures are described below.

Dripproof
Dripproof motors are designed to be internally ventilated by ambient air, having ventilation openings constructed so that successful operation is not affected when drops of liquid or solid particles strike the enclosure at any angle from 0 to 15 degrees downward from vertical. Dripproof motors are typically used in relatively clean, indoor applications.

Weather Protected Type I (WPI)
A weather protected type I machine is an open machine with its ventilating passages so constructed as to minimize the entrance of rain, snow and airborne particles to the electric parts and having its ventilating openings so constructed as to prevent the passage of a cylindrical rod 3/4-inch in diameter.

Weather Protected Type II (WPII)
A weather protected type II machine shall have, in addition to the enclosure defined for a weather protected type I machine, ventilating passages at both intake and discharge so arranged that high-velocity air and airborne particles blown into the machine by storms or high winds can be discharged without entering the interval ventilating passages leading directly to the electric parts of the machine itself. For motors in frames 143T through 449T, standard TEFC motors should be specified. Ratings built in frames 509 and larger utilize dripproof frames with “top hat” mechanical construction to meet the above specifications. WPII motors have provisions for air filters.

Totally-Enclosed
Totally-Enclosed motors are designed so that there is no free exchange of air between the inside and the outside of the enclosure, but not sufficiently enclosed to be airtight. Totally-enclosed motors may be of the following types of construction.

1. TEFC (Totally-Enclosed Fan-Cooled) This type includes an external fan mounted on the motor shaft. This fan is enclosed in a fan casing which both protects the fan and directs the output air over the motor frame for cooling. The airflow is dependent on the shaft speed.
2. TEAO (Totally-Enclosed Air-Over) This type is similar to TEFC designs except that the cooling air being forced over the motor frame is provided by a fan which is not an integral part of the motor. User should ensure the sufficient airflow as mentioned on the nameplate.
3. TENV (Totally-Enclosed Non-Ventilated) This type of construction does not require forced airflow over the motor frame for cooling.
4. TEBV (Totally-Enclosed Blower Ventilated) is used in applications where a separate mounted blower provides supplementary air to cool the motor. Typical uses are in inverter drive application with low frequency. The airflow is independent of the shaft speed.

Piped Ventilation
When motors are cooled by piping in outside air, the required airflow in cubic feet per minute (CFM) can be calculated from the equation:

$$CFM = \frac{Hp \left[\frac{100}{Eff\ \%} - 1 \right] \left[746 \times 1.8 \right]}{10}$$

This results in a 10°C air temperature rise.

HAZARDOUS ‘CLASSIFIED’ LOCATIONS (INCLUDES DIV II)

Specially designed totally-enclosed motors are available for operation in the classes of hazardous atmospheres, as defined by Underwriters Laboratories, the National Electrical Code. Two basic classes are:

Class I Division I Explosion-Proof
An explosion-proof motor is a totally-enclosed machine designed to withstand an explosion of a specified gas or vapor which may occur within it and to prevent the ignition of the specified gas or vapor surrounding the motor.

Class II Division I Dust Ignition Proof
A dust-ignition proof motor is a totally-enclosed machine constructed in a manner which will exclude ignitable amounts of dust or amounts which might affect performance or rating, and which will not permit arcs, sparks, or heat generated inside the enclosure to cause ignition of exterior accumulations or atmospheric suspension of a specific dust and/or in the vicinity of the enclosure.

The various atmospheres defined within the two classes have been divided into groups dependent upon the explosive characteristics of the materials. The class and group of service shall appear on the motor nameplate along with an identification number which identifies a maximum operating temperature as shown in the following tabulations:

Table 37: Hazardous Atmospheres

Class	Group	ID No.	Atmosphere
I	A	T2A	Acetylene
I	B	T2A	Hydrogen, manufactured gas
I	C	T3A	Ethyl ether vapor
I	D	T2A T2D*	Gasoline, petroleum, naptha, alcohols, acetone, lacquer solvents, natural gas
II	E	T3B	Metal dust
II	F	T3B	Carbon black, coal or coke dust
II	G	T3B	Grain dust

*T2A without thermostat/T2D with thermostat

Divisions, Hazardous Location
The National Electrical Code has defined two distinct divisions within each of the hazardous location classes:

A. Class I, Division 1 - A Class I, Division 1 location is a location: (1) in which ignitable concentrations of flammable gases or vapors exist under normal operating conditions; or (2) in which ignitable concentrations of such gases or vapors exist frequently because of repair or maintenance operations or because of leakage; or (3) in which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors, and might also cause simultaneous failure of electric equipment. Division 1 locations always require the use of explosion-proof construction motors.

B. Class I, Division 2 - A Class I, Division 2 location is a location: (1) in which volatile flammable liquids or flammable gases are handled, processed, or used, but in which the liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems, or in case of abnormal operation of equipment; or (2) in which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and which might become hazardous through failure or abnormal operation of the ventilating equipment; or (3) that is adjacent to a Class I, Division 1 location, and to which ignitable concentrations of gases or vapors might occasionally be communicated. The National Electrical Code allows the installation of non-explosion-proof motors in Division 2 locations.

C. Class II, Division 1 - A Class II, Division 1 location is a location: (1) in which combustible dust is in the air under normal operating conditions in quantities sufficient to produce explosive or ignitable mixtures; or (2) where mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be produced, and might also provide a source of ignition through simultaneous failure or electric equipment, operation of protection devices, or from other causes; or (3) in which combustible dusts of an electrically conductive nature may be present. Division 1 locations always require the application of the appropriate dust-ignition proof motor.

D. Class II, Division 2 - A Class II, Division 2 location is a location: (1) in which combustible dust will not normally be in suspension in the air in quantities sufficient to produce explosive or ignitable mixtures, and dust accumulations are normally insufficient to interfere with the normal operation of electrical equipment or other apparatus, or (2) dust may be in suspension in the air as a result of infrequent malfunctioning of handling or processing equipment, and dust accumulations resulting from there may be ignitable by abnormal operation or failure of electrical equipment or other apparatus. The National Electrical Code specifies Class limits when operating at full-load in free air. The surface temperature limits vary with dust characteristics such as ignition temperature, susceptibility to dehydration and potential for carbonization. The controlling document is ANSI/NFPA 70; material characteristics are detailed in NFPA 497M.

E. ATEX Zone 2, Group II, Category 3 In all European Union Member States, the product which is intended for use in potentially explosive atmospheres will need to comply with the ATEX Directive 94/9/EC and the CE Marking Directive. This product is governed by European standard EN60079-15.

Equipment in this category is intended for use in areas in which explosive atmospheres caused by gases, vapors, mists, or air/dust mixtures are unlikely to occur or, it they do occur, are likely to do so only infrequently and for a short period only.

Equipment in this category ensures the requisite level of protection during normal operation.

Table 38: Temperature Identification Numbers

Maximum Temperature		Identification No.
Degrees C	Degrees F	Acetylene
450	842	T1
300	572	T2
280	536	T2A
260	500	T2B
230	446	T2C
215	419	T2D
200	392	T3
180	356	T3A
165	329	T3B
160	320	T3C
135	275	T4
120	248	T48
100	212	T5
85	185	T6

Note: For motors having multiple UL labels, the lowest identification number will apply.

CAUTION: THE RESPONSIBILITY OF SPECIFYING THE PROPER CLASS, GROUP AND DIVISION OF HAZARDOUS LOCATION RESIDES WITH THE ULTIMATE USER AND THE INVOLVED REGULATORY AGENCY.

MOTORS OF HAZARDOUS (Explosive Gas) ATMOSPHERE, PER ATEX:

IEC standards dealing with apparatus for use in explosive gas atmospheres are contained in a series of publication EN60079-0 through EN60079-19. The rules for classification and application of motors in these areas differ considerably from United States standards and practices. Some of the differences are noted in the following summary.

Classification of Gases:
IEC classifies apparatus in two broad groups as follows:
Group 1: for application on coal mining, and
Group 2: for application on other industries.

Group 2 is divided into categories 1, 2 and 3.
'Category 1 equipment' is intended for use in Zone 0 situations.
'Category 2 equipment' is intended for use in Zone 1 situations.
'Category 3 equipment' is intended for use in Zone 2 situations.

Classifications of Hazardous Areas
IEC divides the classification of hazardous areas into three zones according to the degree of hazard, defined as follows.

Zone 0 - A zone in which an explosive gas-air mixture is continuously present or present for long periods.
Zone 1 - A zone in which an explosive gas-air mixture is likely to occur in normal operation.
Zone 2 - A zone in which an explosive gas-air mixture is not likely to occur, and if it occurs it will only exist for a short time.

Thus the following comparison Table 39 applies:

Table 39

ATEX	UL/NEC
Group II, Zone 0	Not Defined
Group II, Zone 1	Class I, Division 1
Group II, Zone 2	Class I, Division 2

Note: EC has established six temperature classes for the grouping of gases relative to the ignition temperature - T1, T2, T3, T4, T5, and T6, for the surface temperature values of this code please refer Table 38.

ENVIRONMENTAL MODIFICATIONS

Care is needed in using motors that have a combination of unusual environmental conditions. For example, a motor with a requirement of high altitude plus high temperature and service factor may be available only in an oversized frame.

ALTITUDE

The rating of standard motors assumes operation at sea level in a 40°C ambient. For purposes of standardization it is considered that there is no difference in motor operating temperature between sea level and 3300 feet altitude.

The cooling effect of ventilating air is a function of its density. The atmospheric pressure and density at higher altitudes is reduced and the air cannot remove as much motor heat, causing the motor to run hotter. As a general guide, motor temperature rise increases 1% for every 330 feet above 3300 feet. To keep motor heating within safe limits at altitudes above 3300, there are the following alternatives:

A. Supply a motor designed for standard sea level operation which can either be:
   1. Operated at less load (a motor with service factor rating of 1.15 or higher can be operated at altitudes up to 9000 feet with a 1.0 service factor),
   or
   2. Operated in a lower ambient temperature per the following Table 40:

Table 40

If Ambient Temperature is:	Maximum Altitude with Same Service Factor is:
30°C	6600 ft.
20°C	9900 ft.

It should be remembered that, although the outdoor ambient temperature at higher altitudes is low, motors probably will be installed indoors in higher ambient temperatures.

Motors applied per A1 or A2 above, will have no special altitude or temperature data on the nameplate.

B. Supply a special motor designed for the required high altitude operation, with appropriate data stamped on the nameplate.

HIGH AMBIENT

Standard motors are designed so that the temperature rise produced within the motor, added to the standard 40°C ambient temperature, will not exceed the winding-insulation temperature limit. If the ambient temperature exceeds 40°C:

A. The temperature rise produced in the motor must be offset by:
   1. Reducing the load and consequent motor losses. A motor rated for a 40°C ambient temperature and operating in a 50°C ambient, will, if rated 1.15 service factor, carry rated Hp with no overload (1.0 SF) and, if rated 1.0 service factor, carry 90% of rated Hp, or by
   2. Applying a special motor design

B. The temperature limit may be raised by the substitution of a higher-temperature insulation system, special grease and bearings.

Motors applied per A1 above will not have special ambient temperature or service factor data on the nameplate.

The choice between A2 and B rests with the motor designer who also may have to use a frame size larger than is standard for the rating.

Explosion-proof motors may require frame sizes different from the corresponding totally-enclosed motors.

WARNING: THE MAXIMUM ALLOWABLE AMBIENT TEMPERATURE FOR EXPLOSION-PROOF MACHINES IS 60°C.

HIGH AMBIENT, SINGLE-PHASE

For operation in ambient temperatures higher than 40°C, refer to Emporium Energy giving full details of the application.

LOW AMBIENT

For operation in ambient temperatures of less than -40°C, give full details of the application. Special low temperature grease and special steel shafts may be required.

DRIP COVERS (WALL OR VERTICAL MOUNTING)

Drip covers can be furnished on standard horizontal motors for added protection from dripping liquids and falling objects when the motor is mounted in other than the horizontal position.

If dripping liquids are present in the application, protective covers are recommended for dripproof construction motors mounted shaft up or shaft down.

EXPORT BOXING AND PACKING

Export boxing and packing should be specified when a motor, and/or spare parts, are to be furnished for export shipment.

GREASE, SPECIAL

Motors designed for unusual environmental conditions or special duty should have bearing grease selected for such service. The most commonly encountered conditions requiring special lubricants are extremely high or low operating ambient. The majority of motor greases used by GE are suitable for operation at ambient temperatures from minus 40°C to plus 40°C.

GE uses special grease for very low ambient and very high ambient.

HARDWARE

Standard motor hardware has a plated protective coating suitable for the corrosive atmospheres generally encountered. For extremely corrosive atmospheres, stainless steel hardware may be required, and should be specified.

PAINT

Standard Finishes

Motors are protected by a two coat paint system. The first coat is a rust-inhibitive primer applied to protect the castings during storage and manufacture. The second coat is a medium light gray or buff semi-gloss paint. Most commercially available paints are compatible with the paint system described above. This is especially useful if the customer chooses to apply any finish coat over the motor paint in his plant when the driven equipment is painted.

Special Finishes

Special paint like polyurethane or carboline epoxy paint system (corrosion resistant epoxy) is used for salty atmospheres.

It's a 3 part paint process
1. Primer coat - Penetrating sealer
2. Intermediate coat - 2 part epoxy
3. Finish coat Polyurethane topcoat with color.

For IEEE 841 motors, the outside surface of ODE IEEE 841 endshields and inside of the fan cover are also coated with at least one finish coat.

Dry film thickness (DFT) adds up to 10 mils.

SCREENS

Intake and Discharge Screens - Dripproof Guarded

Corrosion resistant screens can be furnished over the air-intake and discharge openings of dripproof motors. Dripproof motors that are equipped with these screens conform to the "Dripproof Guarded" definition appearing in NEMA MG-1, Part 1.

Rodent Screens - Rodent screens will be provided where required as part of the dripproof guarded system and with specific request of the purchaser.

SHAFT SEALS (LIP SEAL/NON-CONTACT LABYRINTH SEAL)

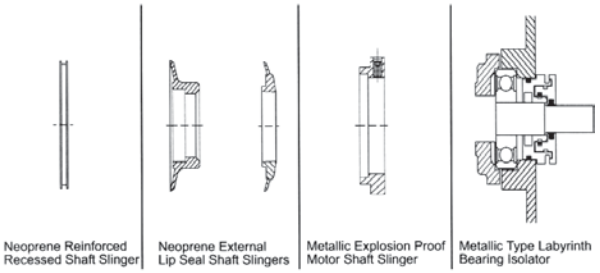


Figure 34

Non-contact Labyrinth seals are metallic seals with rubber sealing rings, which provide protection against both dust and liquids.

Lip seal (contact type) consists of a spring loaded rubber circular lip. The spring loaded lip prevents entry of dust and liquid particles inside the motor.

Either of the above seals are provided on request.

The following tabulation (Table 41) lists the sealing arrangement where shafts emerge from the motor bearing housings.

Table 41: Shaft Seals

GE Motor Enclosure	Motor Frame 143 449	Motor Frame 509 5013
	Shaft Seal	
Standard Dripproof	F	F
Totally Enclosed	F	F
Severe-duty Enclosed	S	S
XSD Ultra®	S	S
Explosion-proof	F*	F*
IEEE-841	L	L
API-661	L	Not Applicable

F = Close running fit at both ends.
S = Neoprene slinger steel reinforced DE and ODE.
L = Non-contact Labyrinth seals.
* Except Class II Group E motors which have non-sparking labyrinth seals.

V. REFERENCE

NEMA VERSUS IEC MOTORS: A BRIEF OVERVIEW

1.0 Standards Organizations

Standard	NEMA (National Electrical Manufacturers Association)
Function	A North American based trade association comprised of 450+ member companies that manufacture electrical transmission and distribution, control, and other electrical type equipment.
Web Address	www.nema.org
Standard	IEC (International Electrotechnical Commission)
Function	A global organization that prepares and publishes international standards for all electrical, electronic and other related technologies.
Web Address	www.iec.ch

2.0 Motor Output

Table 42:
NEMA Output Ratings - Expressed in HP (Horsepower)
IEC Output Ratings - Expressed in kW (Kilowatts)

IEC (kW) Rating	NEMA (HP) Rating	IEC (kW) Rating	NEMA (HP) Rating
0.37	0.5	55	75
0.55	0.75	75	100
0.75	1	90	125
1.1	1.5	110	150
1.5	2	132	-
2.2	3	**150**	**200**
3.7	**5**	160	-
4	5.4	**185**	**250**
5.5	7.5	200	-
7.5	10	**220**	**300**
11	15	250	350
15	20	280	-
18.5	25	**300**	**400**
22	30	315	-
30	40	**335**	**450**
37	50	355	-
45	60	**375**	**500**

Note: kW ratings shown in **bold** text are not typical for standard IEC motors. (Shown only for reference to NEMA comparable HP ratings)

Table 43: HP and kW Power Conversions

Multiply	By	To Obtain
Horsepower (HP)	0.746	Kilowatts (kW)
Kilowatts (kW)	1.341	Horsepower (HP)

3.0 Motor Voltages/Frequencies

A line frequency of 60 HZ is standard for North America, however, outside the United States, many countries are standardized on 50 HZ. Common voltages and frequencies are summarized below.

Table 44

50 HZ	220	240	380*	400*	415	500	660	690
60 HZ	230	-	440	460	480	575	-	-

* Sometimes seen at 60 HZ

4.0 Motor Speeds

Table 45

Synchronous Speeds at No Load for 50 HZ and 60 HZ AC Motors		
Number of Poles	**60 HZ**	**50 HZ**
2	3600	3000
4	1800	1500
6	1200	1000
8	900	750

5.0 Motor Dimensions

NEMA dimensions: Expressed in inches
IEC dimensions: Typically given in millimeters (mm)

IEC uses a different letter nomenclature than NEMA to represent various motor dimensions. The following tables and figures summarize the differences for key dimensions.

NEMA typically assigns the shaft diameter (U) and shaft lengths (N-W) based on assigned frame sizes. IEC has standard shaft dimensions but they are independent of frame size.

Table 46: NEMA/IEC Comparison of Basic Motor Dimension Letters

Motor Dimension	IEC	NEMA
Overall motor length	L	C
Shaft diameter	D	U
Shaft height	H	D
Closest mounting hole centerline to DE shaft shoulder	C	BA
Length of shaft extension from shaft shoulder	E	N-W
Distance from mounting holes in mounting feet (Side view)	B	2F
Distance from mounting holes in mounting feet (Front view)	A	2E

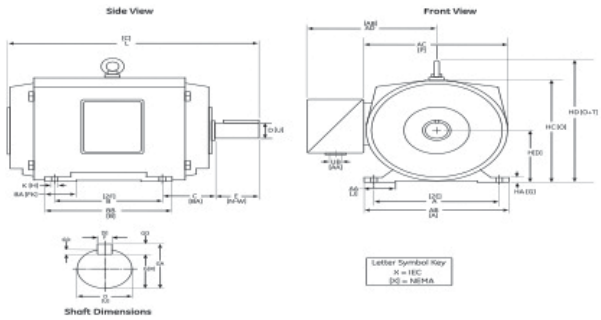


Figure 35

Table 47: Quick Reference of Industrial Applications for 3 Phase Induction Motors

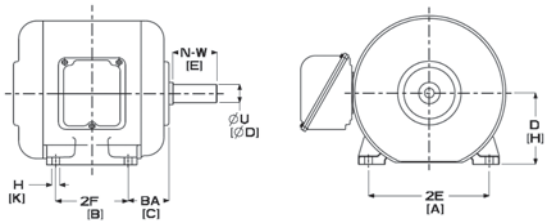
Applications	Requirements					Environment (Subject to Engineering Review)		Standards	GE Types
	NEMA Design	Starting Current	Locked Rotor Torque	Break-Down Torque	% Slip				
Normal starting torque, constant load (single) speed, such as: • Fans • Blowers • Pumps • Machined Tools • Unloaded compressors • Some conveyors • Metal cutting machine tools • Misc. machinery	A	High to Medium	Normal	Normal	Max 5%			NEMA MG1	K, KS XSD Ultra®
								IEEE-841	KS-XSD Ultra® 841
	B	Low	Normal	Normal	Max 5%	Hazardous	DIV 1	UL/CSA	K, KS - XP
							DIV 2	UL/CSA	K, KS
							Zone 1	UL/CSA	K, KS - XP
							Zone 2	UL/CSA ATEX, CE MARK	K, KS
						Marine		IEEE45	KS-XSD Ultra®
Constant load (single) speed High inertia start such as: • Large centrifugal blowers • Flywheels • Crusher Drums • Piston Pumps • Compressors • Conveyors	C	Low	High	Normal	Max 5%	Non Hazardous		NEMA MG1	KG, KGS, XSD Ultra® KGS
						Hazardous	DIV 1	UL/CSA	KG, KGS - XP
							DIV 2	UL/CSA	KG, KGS
							Zone 1	UL/CSA	KG, KGS - XP
							Zone 2	UL/CSA ATEX, CE MARK	KG, KGS
						Marine		IEEE45	KGS-XSD Ultra®
Very high inertia and loaded starts. Choice of slip to match load. • Punch presses • Shears • Forming machine tools • Cranes • Hoists • Elevators • Oil well pumping jacks	D	Low	Very High	-	5-8%	Non Hazardous		NEMA MG1	KR
						Hazardous	DIV 1	UL/CSA	KR XP
							DIV 2	UL/CSA	KR
					8-13%		Zone 1	UL/CSA	KR XP
							Zone 2	UL/CSA ATEX, CE MARK	KR
Constant torque applications, such as: • Agitators • Centrifuges • Conveyors • Extruders • Feeders • Grinders • Kilns • Mills • Mixers • Presses • Saws • Test Stands • Tools	Application Driven	Not Applicable	Not Applicable	Application Driven	-	Non Hazardous		NEMA MG1	KAF/XSD Ultra®
								IEEE-841	KS-XSD Ultra® 841
						Hazardous*	DIV 1	UL/CSA	KAF
							DIV 2	UL/CSA	KAF
							Zone 1	UL/CSA	KAF
							Zone 2	UL/CSA ATEX, CE MARK	KAF
Cooling Tower Fans	A or B	High to Medium	Normal	Normal	Max 5%	##Non Hazardous Suitable for DIV 2		NEMA MG1 API 661	KS-XSD Ultra® 661
Reciprocating Compressors (High Speed)	A or B	High to Medium	Normal	Normal	Max 5%	-		NEMA MG1 API 541 & API 547	500 Frame

* Refer to Emporium Energy for specific suitability requirements such as Auto Ignition Temperature, Gas Groups and Rating Details.
Product offering limitation. Refer to Emporium Energy for more information.

K - NEMA designs A and B
KS - NEMA design A and B Energy Saver
KAF - Adjustable frequency
KG - NEMA design C
KGS - NEMA design C Energy Saver
KR - NEMA design D, 5 to 8% slip or 8 to 13% slip

ANNEXURE A

Table 48: Quick Comparison Between NEMA and IEC Mounting Dimensions



Dimensions in reference above sketch stand for NEMA (IEC)

Frame Size		D (H)		2E (A)		2F (B)		BA (C)		H (K)		N-W (E)		ØU (ØD)	
		IEC	NEMA	IEC	NEMA	IEC	NEMA	IEC	NEMA	IEC	NEMA	IEC	NEMA	IEC	NEMA
IEC	NEMA	mm	mm (inch)	mm	mm (inch)	mm	mm (inch)	mm	mm (inch)	mm	mm (inch)	mm	mm (inch)	mm	mm (inch)
90S	143	90	88.9 (3.5)	140	139.7 (5.5)	100	101.6 (4)	56	57.2 (2.25)	10	8.6 (0.34)	50	57.15 (2.25)	24	22.225 (0.875)
90L	145	90	88.9 (3.5)	140	139.7 (5.5)	125	127 (5)	56	57.2 (2.25)	10	8.6 (0.34)	50	57.15 (2.25)	24	22.225 (0.875)
112S	182	112	114.3 (4.5)	190	190.5 (7.5)	114	114.3 (4.5)	70	69.9 (2.75)	12	10.4 (0.41)	60	69.85 (2.75)	28	28.575 (1.125)
112M	184	112	114.3 (4.5)	190	190.5 (7.5)	140	139.7 (5.5)	70	69.9 (2.75)	12	10.4 (0.41)	60	69.85 (2.75)	28	28.575 (1.125)
132S	213	132	133.4 (5.25)	216	215.9 (8.5)	140	139.7 (5.5)	89	88.9 (3.5)	12	10.4 (0.41)	80	82.852 (3.38)	38	34.925 (1.375)
132M	215	132	133.4 (5.25)	216	215.9 (8.5)	178	177.8 (7)	89	88.9 (3.5)	12	10.4 (0.41)	80	82.852 (3.38)	38	34.925 (1.375)
160M	254	160	158.8 (6.25)	254	254 (10)	210	209.6 (8.25)	108	108 (4.25)	14.5	13.5 (0.53)	110	101.6 (4)	42	41.275 (1.625)
160L	256	160	158.8 (6.25)	254	254 (10)	254	254 (10)	108	108 (4.25)	14.5	13.5 (0.53)	110	101.6 (4)	42	41.275 (1.625)
180M	284	180	177.8 (7)	279	279.4 (11)	241	241.3 (9.5)	121	120.6 (4.75)	14.5	13.5 (0.53)	110	117.348 (4.62)	48	47.625 (1.875)
180L	286	180	177.8 (7)	279	279.4 (11)	279	279.4 (11)	121	120.6 (4.75)	14.5	13.5 (0.53)	110	117.348 (4.62)	48	47.625 (1.875)
200M	324	200	203.2 (8)	318	317.5 (12.5)	267	266.7 (10.5)	133	133.4 (5.25)	18.5	16.8 (0.66)	110	133.35 (5.25)	55	53.975 (2.125)
200L	326	200	203.2 (8)	318	317.5 (12.5)	305	304.8 (12)	133	133.4 (5.25)	18.5	16.8 (0.66)	110	133.35 (5.25)	55	53.975 (2.125)
225S	364	225	228.6 (9)	356	355.6 (14)	286	285.6 (11.25)	149	149.4 (5.88)	18.5	16.8 (0.66)	140	149.352 (5.88)	60	60.325 (2.375)
225M	365	225	228.6 (9)	356	355.6 (14)	311	311.2 (12.25)	149	149.4 (5.88)	18.5	16.8 (0.66)	140	149.352 (5.88)	60	60.325 (2.375)
250S	404	250	254 (10)	406	406.4 (16)	311	311.2 (12.25)	168	168.1 (6.62)	24	20.6 (0.81)	140	184.15 (7.25)	65	73.025 (2.875)
250M	405	250	254 (10)	406	406.4 (16)	349	349.2 (13.75)	168	168.1 (6.62)	24	20.6 (0.81)	140	184.15 (7.25)	65	73.025 (2.875)
280S	444	280	279.4 (11)	457	457.2 (18)	368	368.3 (14.5)	190	190.5 (7.5)	24	20.6 (0.81)	140	215.9 (8.5)	75	85.725 (3.375)
280M	445	280	279.4 (11)	457	457.2 (18)	419	419.1 (16.5)	190	190.5 (7.5)	24	20.6 (0.81)	140	215.9 (8.5)	75	85.725 (3.375)
315S	504	315	317.5 (12.5)	508	508 (20)	406	406.4 (16)	216	215.9 (8.5)	28	-	-	-	-	-
315M	505	315	317.5 (12.5)	508	508 (20)	457	457.2 (8.5)	216	215.9 (8.5)	28	-	-	-	-	-

Important Note: The shaft extension indicated above for NEMA pertains to 'T-shaft extension'.

Note: Above table should not be used as an exact comparison for NEMA and IEC frame sizes.

ANNEXURE B
HISTORY INDICATING THE FRAME SIZE REDUCTION FOR NEMA AC MOTORS

Table 49 - Open Drip-Proof

THREE PHASE FRAME SIZES - GENERAL PURPOSE												
RPM	3600			1800			1200			900		
NEMA Program Hp	Orig. (Pre-U)	1952 Rerate (U)	1964 Rerate (T)	Orig. (Pre-U)	1952 Rerate (U)	1964 Rerate (T)	Orig. (Pre-U)	1952 Rerate (U)	1964 Rerate (T)	Orig. (Pre-U)	1952 Rerate (U)	1964 Rerate (T)
1	-	-	-	203	182	143T	204	184	145T	225	213	182T
1.5	203	182	143T	204	184	145T	224	184	182T	254	213	184T
2	204	184	145T	224	184	145T	225	213	184T	254	215	213T
3	224	184	145T	225	213	182T	254	215	213T	284	254U	215T
5	225	213	182T	254	215	184T	284	254U	215T	324	256U	254T
7.5	254	215	184T	284	254U	213T	324	256U	254T	326	284	256T
10	284	254U	213T	324	256U	215T	326	284U	256T	364	286U	284T
15	324	256U	215T	326	284U	254T	364	324U	284T	365	326U	286T
20	326	284U	254T	364	286U	256T	365	326U	286T	404	364U	324T
25	364S	286U	256T	364	324U	284T	404	364U	324T	405	365U	326T
30	364S	324S	284TS	365	326U	286T	405	365U	326T	444	404U	364T
40	365S	326S	286TS	404	364U	324T	444	404U	364T	445	405U	365T
50	404S	364S	324TS	405S	365US	326T	445	405U	365T	504U	444U	404T
60	405S	365US	326TS	444S	404US	364T	504U	444U	404T	505	445U	405T
75	444S	404US	364TS	445S	405US	365T	505	445U	405T	-	-	444T
100	445S	405US	365TS	504S	444US	404T	-	-	444T	-	-	445T
125	504S	444US	404TS	505S	445US	405T	-	-	445T	-	-	-
150	505S	444US	405TS	-	-	444T	-	-	-	-	-	-
200	-	-	444TS	-	-	445T	-	-	-	-	-	-
250	-	-	445TS	-	-	-	-	-	-	-	-	-

ANNEXURE B
HISTORY INDICATING THE FRAME SIZE REDUCTION FOR NEMA AC MOTORS

Table 50 - Totally Enclosed Fan Cooled

THREE PHASE FRAME SIZES - GENERAL PURPOSE												
RPM	3600			1800			1200			900		
NEMA Program Hp	Orig. (Pre-U)	1952 Rerate (U)	1964 Rerate (T)	Orig. (Pre-U)	1952 Rerate (U)	1964 Rerate (T)	Orig. (Pre-U)	1952 Rerate (U)	1964 Rerate (T)	Orig. (Pre-U)	1952 Rerate (U)	1964 Rerate (T)
1	-	-	-	203	182	143T	204	184	145T	225	213	182T
1.5	203	182	143T	204	184	145T	224	184	182T	254	213	184T
2	204	184	145T	224	184	145T	225	213	184T	254	215	213T
3	224	184	182T	225	213	182T	254	215	213T	284	254U	215T
5	225	213	184T	254	215	184T	284	254U	215T	324	256U	254T
7.5	254	215	213T	284	254U	213T	324	256U	254T	326	284U	256T
10	284	254U	215T	324	256U	215T	326	284U	256T	364	286U	284T
15	324	256U	254T	326	284U	254T	364	324U	284T	365	326U	286T
20	326	286U	256T	364	286U	256T	365	326U	286T	404	364U	324T
25	365S	324U	284TS	365	324U	284T	404	364U	324T	405	365U	326T
30	404S	326S	286TS	404	326U	286T	405	365U	326T	444	404U	364T
40	405S	364US	324TS	405	364U	324T	444	404U	364T	445	405U	365T
50	444S	365US	326TS	444S	365US	326T	445	405U	365T	504U	444U	404T
60	445S	405US	364TS	445S	405US	364T	504U	444U	404T	505	445U	405T
75	504S	444US	365TS	504S	444US	365T	505	445U	405T	-	-	444T
100	505S	445US	405TS	505S	445US	405T	-	-	444T	-	-	445T
125	-	-	444TS	-	-	444T	-	-	445T	-	-	-
150	-	-	445TS	-	-	445T	-	-	-	-	-	-

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REFERENCES

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