



GE Energy Connections
Power Conversion



GE's Power Conversion business:
Having the right partner is as vital
as having the right technology.

Medium / High Voltage and High Speed Motors

Compact. Reliable. Efficient

www.gepowerconversion.com

© 2016 General Electric Company and/or its affiliates. GE Proprietary Information. All Rights Reserved. No part of this document may be reproduced, transmitted, stored in a retrieval system nor translated into any human or computer language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual, or otherwise, without the prior written permission of the General Electric Company or its associated affiliates.
GEA32439346/2016 6686 Industrial Generation for other UN66016 Motors

ge.com

Industry leading technologies and integrated solutions.

About GE Power Conversion

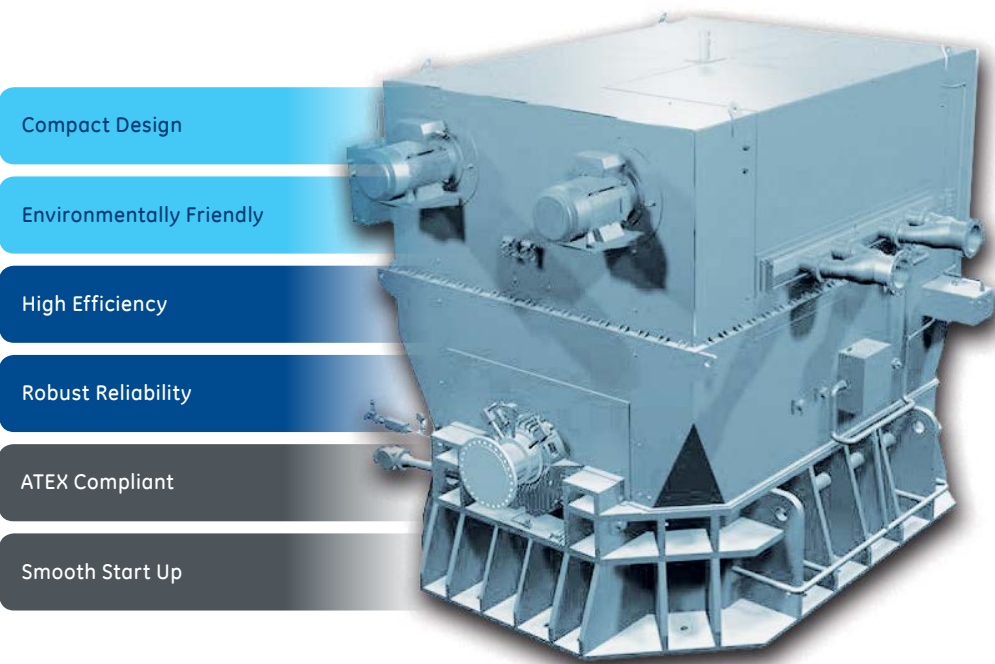
We are at the heart of efficiently connecting electricity to industry. We build industry-leading technologies and integrated solutions. Designing and delivering advanced motor, generator, drive and control technologies that evolve today's industrial processes for a cleaner, more productive future, it serves specialized sectors such as energy, marine, industry and all related services.

Contents

MV Motors	4
GE Value	6
MV Motors Product Portfolio	
• Portfolio Overview	8
• NGV Series	10
• NHP Series	11
• NMP Series	12
• NXD Series	13
Services	14
Contact Us	17

Induction Motors

A reliable choice for almost all applications



- Compact Design
- Environmentally Friendly
- High Efficiency
- Robust Reliability
- ATEX Compliant
- Smooth Start Up

GE's induction motor technology delivers high reliability and efficiency, primarily by drastically reducing the rotor's parts. It means a leaner, lower maintenance motor that consistently delivers the power you need. With the recent advances of GE's high powered, variable frequency drives, induction motors can now be used in almost all applications where high reliability and robust performance is required.

ROBUSTNESS & SIMPLICITY

The main advantages of an induction motor are the robust mechanical construction of the rotor and the reduction in the number of parts required compared to a synchronous motor. Induction motors offer lower weight and inertia, high efficiency, higher overload capacity and are more cost effective to manufacture than the equivalent synchronous machine.

The design and features of induction motors also allow almost maintenance free operation, providing dependable performance in any circumstance.

APPLICATIONS

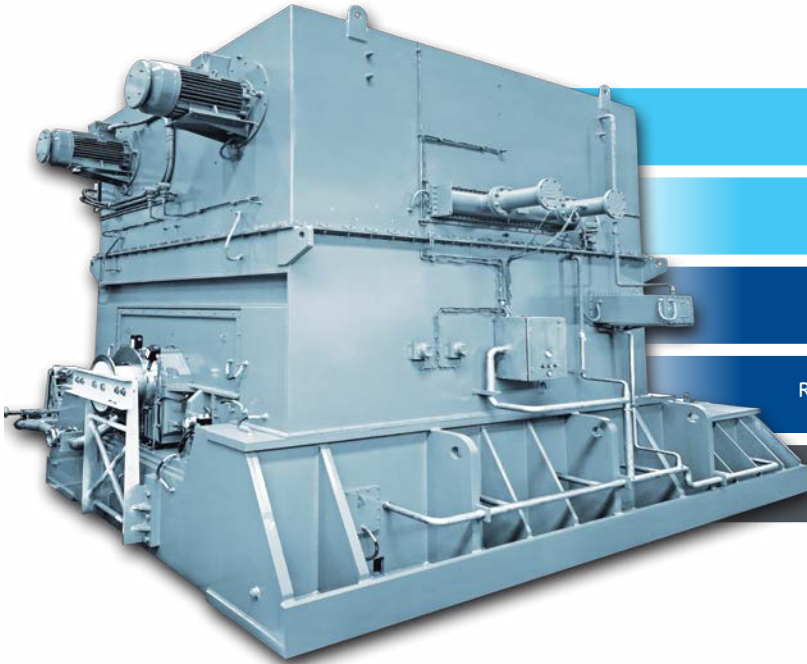
Fans, pumps, compressors, grinding mills, metal rolling, mine hoists, refiners, propulsion and many others.

INDUSTRIES

- Oil & Gas
- Mining & Metals
- Power & Energy
- Marine
- Pulp & Paper
- Water & Wastewater
- Other Process Industries

Synchronous Motors

For high efficiency and reliability



- High Reliability
- High Efficiency
- Reduced OPEX
- Reduced Maintenance
- Smooth Start Up

GE offers a full range of horizontal and vertical synchronous motors, ranging from direct-drive high torque density motors (at speeds as low as 20 rpm) to turbo-type motors for compressor applications.

SYNCHRONOUS MOTOR ROTOR PLATFORMS

- Salient pole rotors (both laminated and solid pole versions available-dependent upon starting requirements or duty cycle)
- We can rapidly adapt our standard product platforms to cater for many applications or any proposed starting methods, including:
- Fixed-speed started by asynchronous means, e.g. direct-on-line, series reactor, capacitor, reactor/capacitor, auto-transformer (single or multi-stage)
 - Fixed-speed started by pony motor, electronic soft starter or mechanical gear system (i.e. variable speed planetary gear)
 - Variable speed drive system controlled (MV7000)

APPLICATIONS

Fans, pumps, compressors, grinding mills, metal rolling, mine hoists, refiners, propulsion and many others.

INDUSTRIES

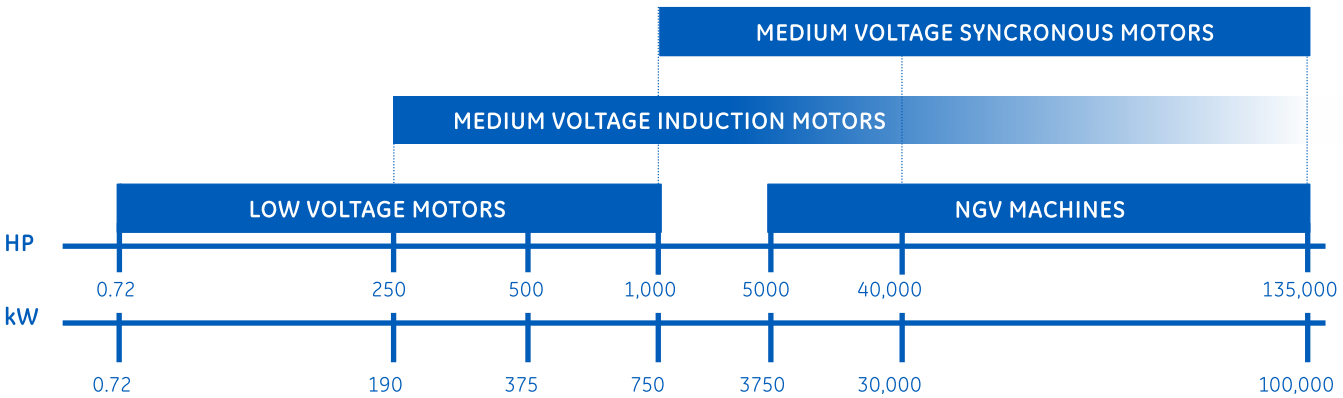
- Oil & Gas
- Mining & Metals
- Power & Energy
- Marine
- Pulp & Paper
- Water & Wastewater
- Other Process Industries

GE Value

Solutions built on extensive rotating machine experience

SETTING THE STANDARD IN MANUFACTURING MOTORS FOR OVER 125 YEARS

ELECTRIC MOTORS RANGE



WE CONTINUE TO INNOVATE WITH PRODUCT QUALITY

GE has been setting the standard in manufacturing rotating machines for over 125 years. We continue to deliver innovative mechanical power solutions to the world. Motors are designed and manufactured to operate efficiently and reliably in challenging applications and severe environments where reliability and ease of maintenance is critical.

HIGH SPEED MACHINES

With over 120 machines in our reference list, GE is one of the leading supplier of high speed motors. We have 20 years of experience with high speed machine designs and are constantly improving it to ensure reliable performance for this demanding application. Eliminating the gear box allows significant overall footprint savings.

Our third generation MGV induction range is based on a reliable 'stiff-shaft' design. Available with a Class H insulation system, sleeve, tiling pad or active magnetic bearings, we offer a flexible design suitable for a broad range of applications.

Integrated Compressor Line (ICL): Centrifugal compressors directly driven by high-speed electric motors for applications up to 15 MW / 20,000 hp. ICL delivers high efficiency and reliability, fast start/stop, low maintenance, low operating cost, and a much broader operating range than conventional compressors.

INDUCTION MOTORS

UP TO 48% INCREASED UPTIME

- Delivers greater reliability and efficiency primarily by reducing the rotor's parts by X 10
- Leaner, low-maintenance motor that delivered extended maintenance periods and longer periods of uninterrupted operation. 5+ years of operation.

INCREASED SYSTEM EFFICIENCY FOR LOWER POWER CONSUMPTION

- Increased operational flexibility and efficiency
- Up to 98.1% operational efficiency

SYNCHRONOUS MOTORS

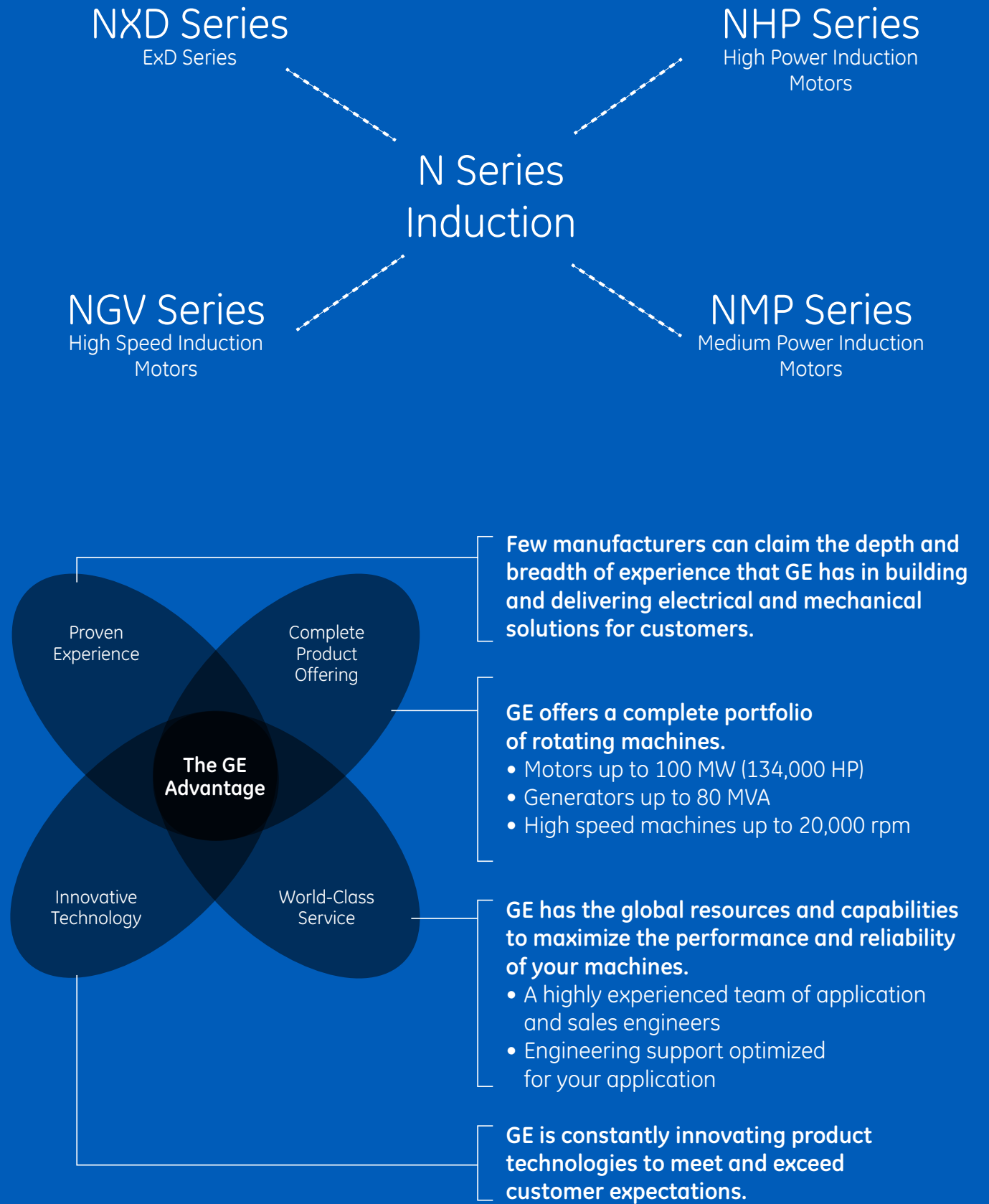
STATOR FRAME AND MAGNETIC CORE

- Low loss core design
- Easy access for routine maintenance
- Low vibration long life
- Pin Vent technology reduces hot-spot compared to I-beams technology

ROTOR

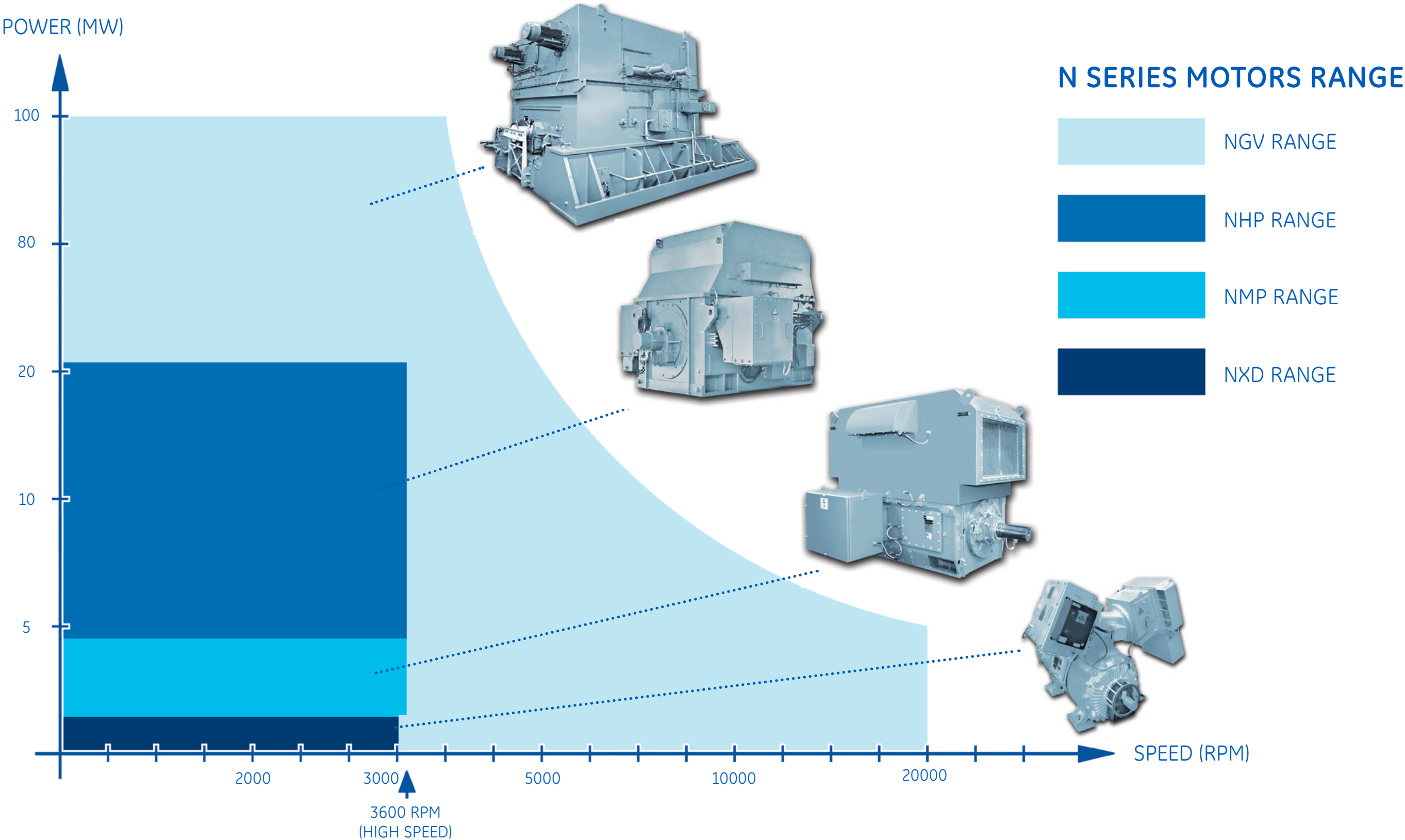
- The shaft is single piece, solid forging or laminated steel
- All rotor are carefully balanced to comply with standards requirements

A RANGE OF SOLUTIONS TO MEET YOUR NEEDS



Comprehensive offering

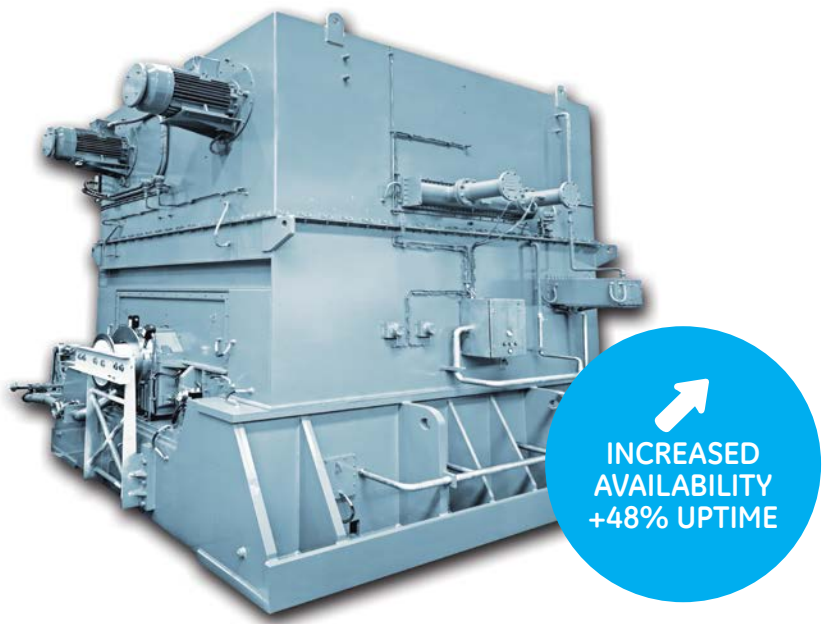
Portfolio of electric motors for industrial applications



NGV Series

High Power Induction Motors

SIMPLY MORE RELIABLE



UP TO 48% INCREASED UPTIME*

- Delivers greater reliability and efficiency primarily by reducing the rotor's parts by X 10
- Leaner, low-maintenance motor that delivered extended maintenance periods and longer periods of uninterrupted operation. 5+ years of operation.

INCREASED SYSTEM EFFICIENCY

- Increased operational flexibility and efficiency
- Up to 98.1% operational efficiency
- Opex savings when combined with VSI drive (~+1.25%** increased overall system efficiency...lower power consumption)

	NGV MACHINE DATA
Frame Size	450 to 2000
Poles	2
Frequency	up to 300Hz
Cooling	TEWAC, TEAAC, TEPV
Power	up to 100 MW
Client Network Voltage	1000 to 13800 V

KEY FEATURES & BENEFITS

- Lower OPEX
- Easy installation
- Easy maintenance
- More efficient speed ranges
- Lower CAPEX
- A smaller motor requiring smaller foundations
- Greater availability
- Ideal for the typical five year run time of large liquefaction units

DRIVEN MACHINES: Reciprocating compressors, Centrifugal compressors, Pumps, blower, fan, extruders

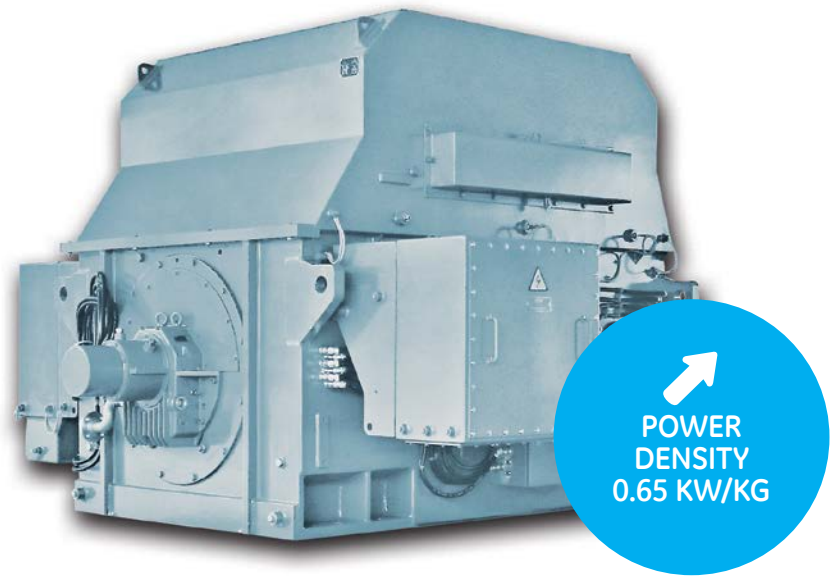
*based on comparison study with equivalent 80mw synchronous motor
** estimate from comparison between global system efficiency of Freeport project – induction vs synchronous

ATEX/IEC/IECEx PROTECTION

NHP Series

High Power Induction Motors

MORE POWER IN A SMALLER PACKAGE



COMPACT BUT MIGHTY

GE's NHP Series machines provide the highest power density in its class, plus an innovative upgrade to the well-established N3 motor line in a compact frame doesn't compromise on efficiency and reliability. A specially-designed frame and stator design in the N Series cools so effectively, that higher power ratings are easily achieved by smaller frame sizes.

WHEN SPACE MATTERS MOST

With a lower frame size than conventional induction motors, this compact design translates to space savings and lower weight. This is essential both in onshore and offshore applications where space is at a premium and in platforms that require less weight.

	NHP MACHINE DATA
Frame Size	500 to 1400
Poles	2 to 30
Frequency	50 Hz , 60 Hz, or VFD
Cooling	TEAAC, TEWAC
Power	4.6 to 30 MW
Client Network Voltage	3300 to 13800 V

KEY FEATURES & BENEFITS

- Best in class power density
- Best in class efficiency
- Low noise
- Low weight
- Proven design + innovative components
- Installed base of 7.6+ GW
- Designed to last 20+ years
- Low inrush current machines for weak networks
- State of the art manufacturing equipment
- Test facility up to 27MW

DRIVEN MACHINES: Reciprocating compressors, Centrifugal compressors, Pumps, blower, fan, extruders

ATEX/IEC/IECEx PROTECTION

NMP Series

Medium Power Induction Motors

BEST IN CLASS MACHINES



MAXIMIZING CUSTOMER OUTCOMES

- Reduce opex with longer durability & lower vibration
- Reduce capex with lighter machines that enable less foundations and associated costs
- Safer machines that reduce energy consumption

BUILT FOR DURABILITY

- For over 100 years, GE has produced countless medium voltage induction machines for the petrochemical, power generation, mining and minerals, water and wastewater industries.

	NMP MACHINE DATA
Frame Size	450, 500, 560
Poles	2, 4, 6
Frequency	50 or 60 Hz, or VFD
Cooling	TEAAC, TEWAC, WPII
Power	1MW to 5MW
Client Network Voltage	50 Hz: 3.3, 6.6 , 11 KV 60 Hz: 4.16 , 6.6 , 13.8 KV

KEY FEATURES & BENEFITS

- Best in class Noise level
- Best in class Design
- High Reliability
- Energy savings
- <85 dB(A)
- Robust design optimize footprint and weight
- Reduced vibration & maintenance
- Reduced energy consumption for lower OPEX

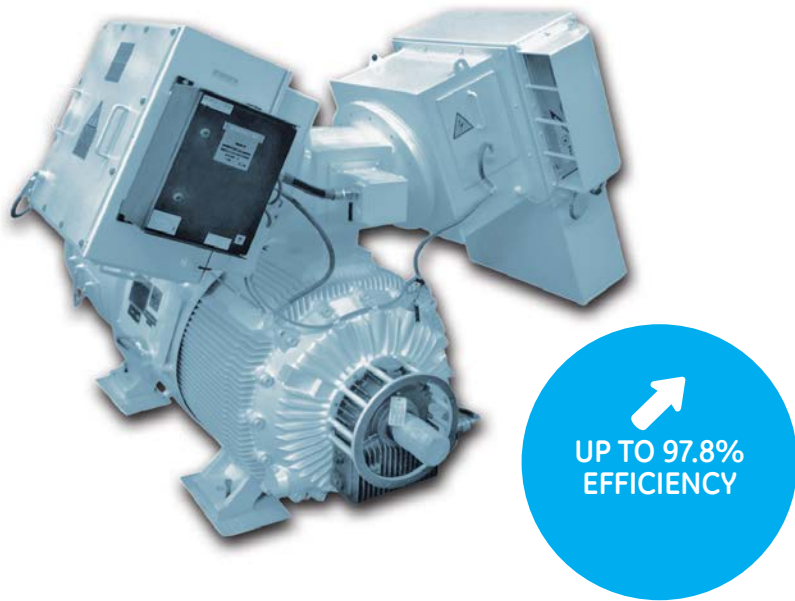
DRIVEN MACHINES: Reciprocating compressors, Centrifugal compressors, Pumps, blower, fan, extruders

ATEX/IEC/IECEx PROTECTION

NXD Series

High Power Induction Motors

SAFETY AND PERFORMANCE



DELIVERING A RANGE OF HIGH PERFORMANCE FLAMEPROOF MOTORS

In many industrial sectors explosion protection is the significant necessity, e.g. in the chemicals industry, in refineries, on drilling platforms. The risk of explosion is always present when gases, fumes, mist or dust are mixed with oxygen in the air in an explosive ratio close to sources

of ignition that are able to release the so-called minimum ignition energy.

Our scope of supply for the range of flameproof motors addressed to various markets to prevent explosion hazards that result in serious injury to persons and severe damage to property.

	NXD MACHINE DATA
Frame Size	355, 400, 450, 500
Poles	2 to 12
Frequency	50 or 60 Hz, or VFD
Cooling	TEFC
Power	200 to 1600kW
Client Network Voltage	2000 to 11000 V

KEY FEATURES & BENEFITS

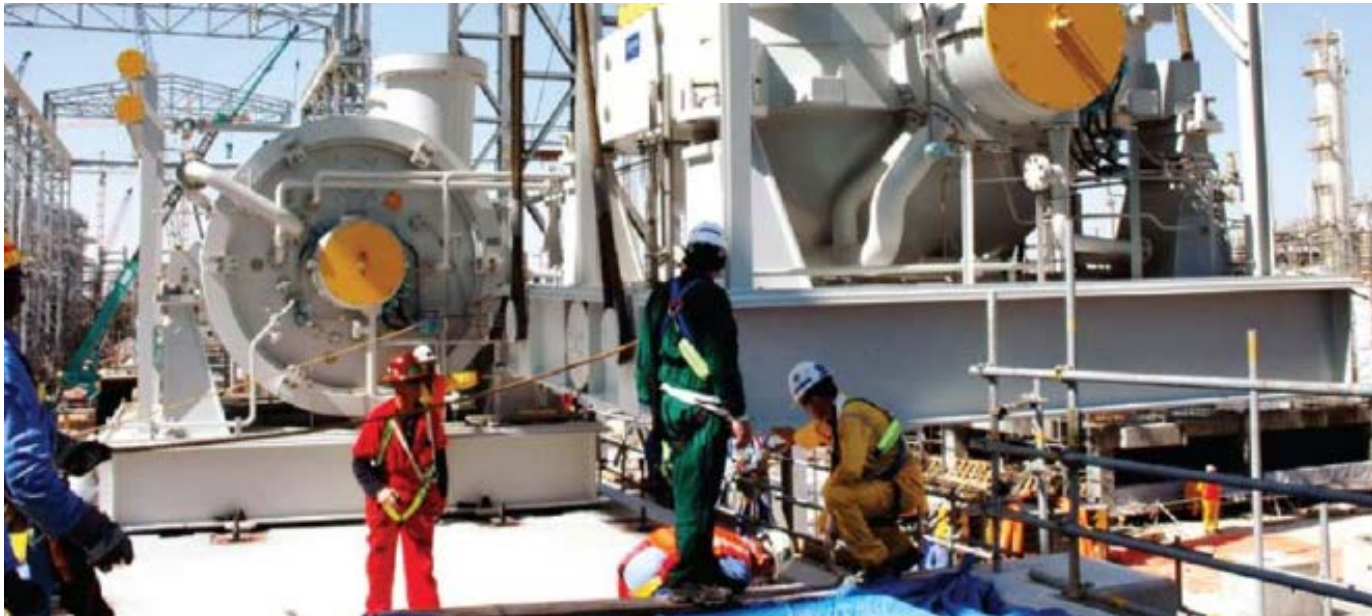
- High efficiency
- Low noise level
- Safe solution for hazadous area
- Safe protection for O&G and mining market segments
- Simple and high performance design
- Suitable for hazardous area zone 1 and 2
- 85 dB(A)
- Efficiency : up to 97.8%

DRIVEN MACHINES: Pumps, Screw Compressors, Extruders and Fans

ATEX/IEC PROTECTION

Services...

...Across the product life cycle



CARING FOR YOUR NEEDS

At GE, we understand that the goals of your organization are demanding, and evolving. To help you meet these goals here at GE Power Conversion we provide a service that goes beyond just waiting for your call.

We offer a comprehensive range of aftermarket services including replacement units, field services, spares, in-shop repairs, service agreements, unit upgrades and technical support. Our mission is to satisfy our customers needs in the aftermarket of power generation.

INSTALLATION & COMMISSIONING

Installing with confidence. Our team of field service engineers are on hand to ensure your assets go into active service functioning efficiently.

INSPECTION & REPAIR

We offer a broad array of generator, excitation and protection relaying inspection and repairs services, supported through our international network of GE specialists and service shops.

Our team of project management experts are available to support and schedule your overhaul requirements, working with you to ensure that you are provided regular project updates and work is completed to your satisfaction on time.

TRAINING PROGRAMS

Through our in-depth training modules we provide our customers with the knowledge and skills to operate and maintain equipment in the field.

SERVICE CONTACT CENTERS

Our global service call center is available 24 hours a day, 7 days a week. Supporting our customers to register and assign your enquiry to the appropriate expert team within the GE Power Conversion technical network for assistance.

Contact our global service call centre* by telephone or email: escc.geem@ge.com.

France	+33 177312323 (Nancy?)
Germany	+49 69 66125588
India	+91 44 496 80008
UAE	+971 2 6994931
UK	+44 1788 563800
USA	+1 844 4374474
China	+86 400 021 5605
ANZ	+61 1300 193 189

*Note that you may be charged different rates when calling from a mobile. Toll free numbers are toll free only in certain countries. Please check with your local provider.

ENHANCED TECHNICAL SUPPORT

We offer enhanced technical support to customers with service agreements. Our enhanced technical support agreements are designed to suit your specific needs including the availability of 24/7 on-call technical assistance, remote support and immediate mobilization to emergencies.

SPARES AND CONSUMABLES

The GE Parts team is available to advise the appropriate spares and consumable parts for you to hold in stock. For those emergencies - the team will provide the parts you need on time and at the quality you expect.

DIAGNOSTICS AND SPECIALIZED

Delivering state of the art test and diagnostic services, our specialist field engineers will apply our in house analysis tools to analyse the asset's performance. Working with you to resolve issues on installations in the field efficiently and reliably.

UNIT UPGRADES

To extend the life of your asset, our engineering design team will provide you with suitable upgrade options aligned to meet your technical specification and requirements to improve efficiency, production and to reduce emissions.

SERVICE FOR A LIFETIME

Our goal is to provide you with a complete product life-cycle solution, to minimize risk and help you get the most out of your asset.

We're at work with you

Wherever you are across the globe... We're adding people, parts and perspective to your everyday operations. Helping to keep your operations running smoothly... for the long term.



HAVING THE RIGHT
PARTNER IS AS VITAL
AS HAVING THE RIGHT
TECHNOLOGY.

Global Partner. Local Footprint.

Motor Manufacturing Capabilities

PROVEN EXPERIENCE

Few manufacturers can claim the depth and breadth of experience that GE has in building and delivering electrical and mechanical solutions for customers.

COMPLETE PRODUCT OFFERING

GE offers a complete portfolio of rotating machines.

- Motors up to 100 MW (134,000 HP)
- Low and medium voltage variable frequency drives

WORLD CLASS SERVICE

GE has the global resources and capabilities to enhance the performance and reliability of your machines.

- A highly experienced team of application and sales engineers
- Engineering support optimized for your application

INNOVATIVE TECHNOLOGY

GE is constantly innovating product technologies to solve your challenges.

POWER CONVERSION HEADQUARTERS:

GE Energy Power Conversion Group
Europlaza
20 Avenue Andre Prothin
F-92927 Paris La Defense Cedex 18
France

www.gepowerconversion.com

OUR CENTER OF EXCELLENCE FOR MOTORS:

GE Energy Power Conversion France SAS
442 Rue de la Rompure
F-54250 Champigneulle
France