



Rotating Machines Manufacturing Capability

Campinas, Brazil

gepowerconversion.com

CATALOG

The Site

GE Values

- Extensive manufacturing flexibility
- Integrated engineering capabilities
- Comprehensive range of high efficiency and high power density machines for all general industries, oil & gas and special applications
- ISO 9001 certified since 1992

GE Power Conversion

Overview

GE Power Conversion Campinas	
Site Area	367,000 m ²
Manufacturing Area	37,400 m ²
Office Area	57,300 m ²
Engineering 60+ Employees	
End-markets	Oil & Gas; Marine; Industry; Power & Water; Renewables; Mining, Cement & Metals; Automotive; Paper; Biomass
Manufacturing Lifting Capacity	Max Lifting Load: 150 ton Max Crane Load: 150 ton Max Forklift Load: 25 ton
Manufacturing Capacity	140 Production Equipments



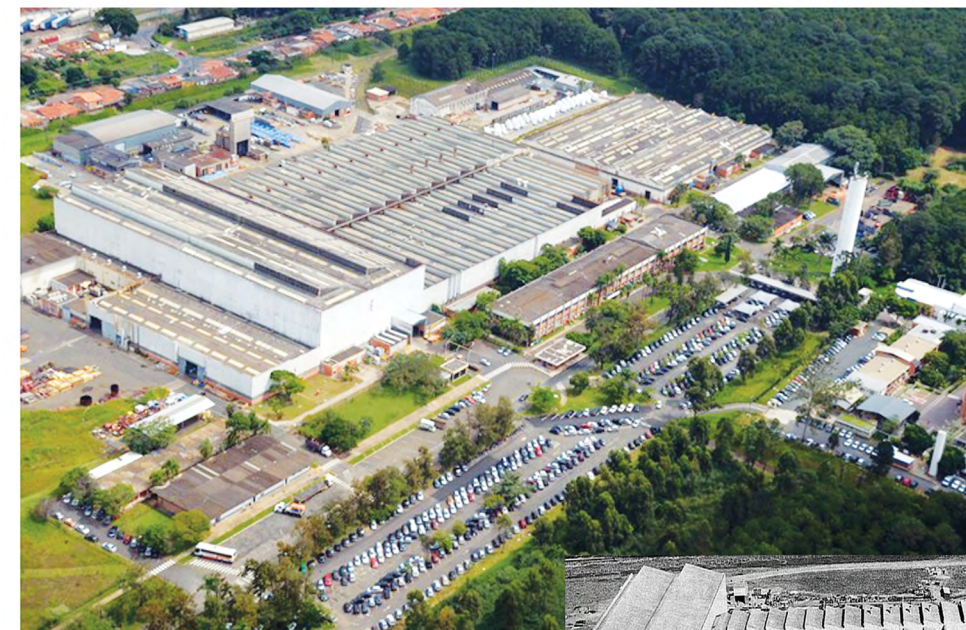
- ✓ Located 100 km from **São Paulo**
- ✓ 160 km from **Santos** (largest port in Brazil)
- ✓ 30 km from **Viracopos** (best cargo airport in the world - Air Cargo Excellence Awards 2018)

✓ **Center of Excellence** for medium and large induction machines and synchronous electric machines

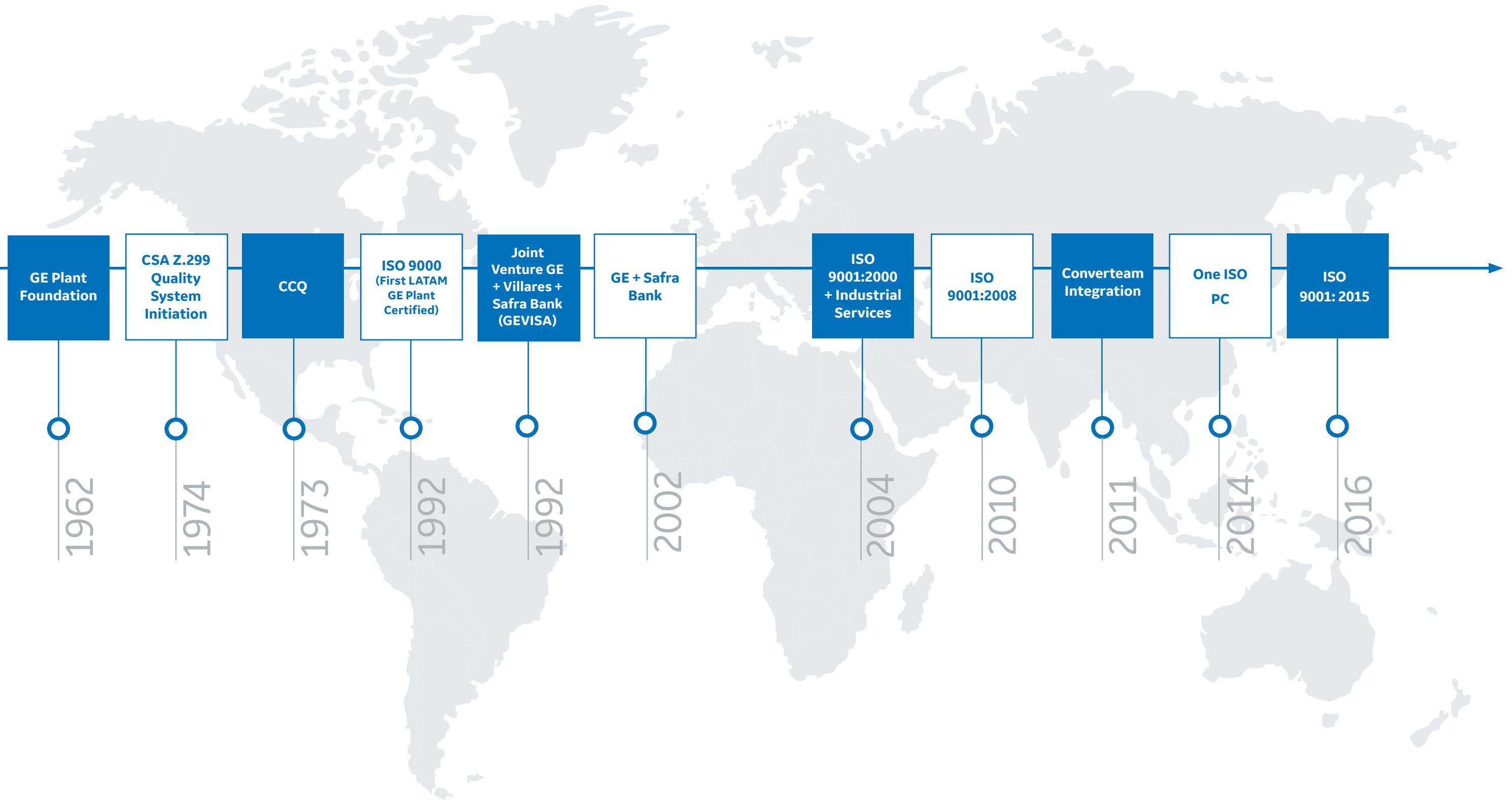
✓ **Established since 1962**

✓ **12,000+** Induction Machines

✓ **500+** Synchronous Machines



Quality System and Product Certification



Our Products and Services

Product Portfolio

MEDIUM AC INDUCTION MOTORS



- C7
- Custom 8000 Horizontal and Vertical
- Pegasus Horizontal and Vertical

SYNCHRONOUS MOTORS



- HS9000
- LS9000
- Quadramatic

WIND GENERATORS



- Doubly-Fed Induction Generator (DFIG)

HIGH SPEED GENERATORS



- Laminated rotors
- Integral solid pole rotors

SMALL HYDRO GENERATORS



- Horizontal & Vertical

LARGE DC MOTORS



Induction Motors

MEDIUM & HIGH POWER INDUCTION MOTORS

BEST IN CLASS MACHINES



MAXIMIZING CUSTOMER OUTCOMES

- Reduced OPEX with longer durability & lower vibration
- Reduced capex with lighter machines that enable less foundations and associated costs
- Machines with high efficiency reducing 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/NHP MACHINE DATA
Frame Size	IEC: 400 to 1120 / NEMA: 580 and above
Poles	2 to 24
Frequency	50 & 60 Hz (or VFD)
Cooling	IEC: IC411, IC01, IC611, IC81W NEMA: WP I - II, TEAAC, TEWAC
Power	1MW to 20MW
Voltage	3300 to 13800V

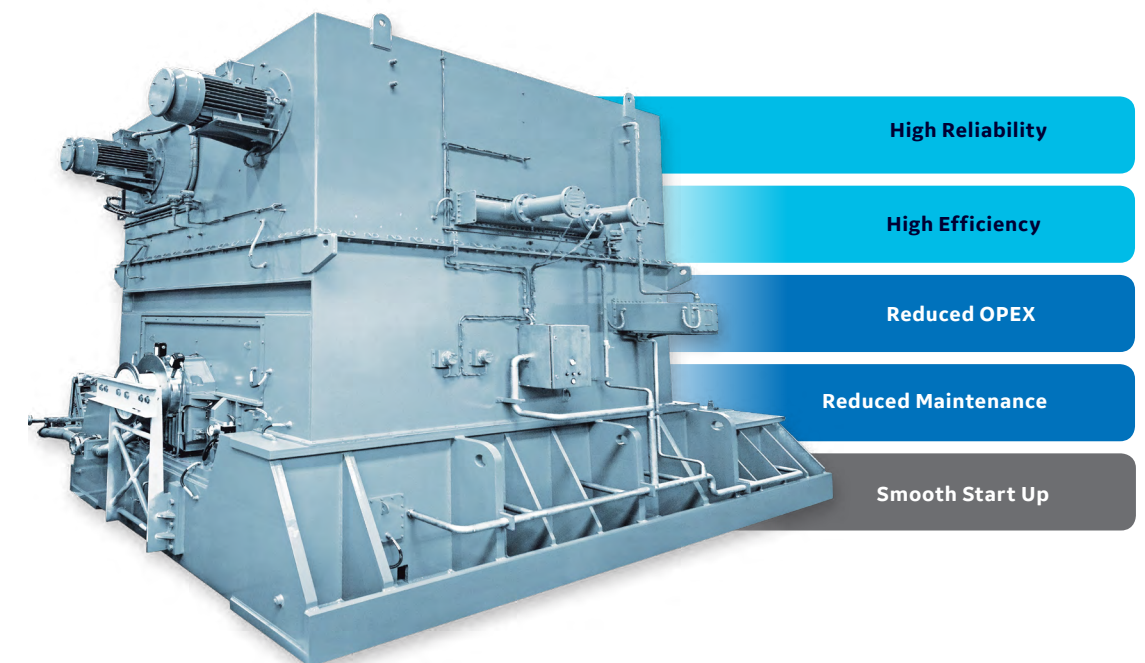
KEY FEATURES & BENEFITS

- Best in class Noise level
- Best in class Design
- High Reliability
- Energy savings
- Robust design optimized footprint and weight
- Reduced vibration & maintenance
- Reduced energy consumption for lower OPEX

DRIVEN MACHINES: Reciprocating Compressors, Centrifugal Compressors, Pumps, Blowers, Fans, Extruders, Crushers, Conveyors, Mills.

Synchronous Motors

FOR HIGH EFFICIENCY AND RELIABILITY



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

SYNCHRONOUS MACHINE ROTOR PLATFORMS

- Salient pole rotors (both laminated and integral solid pole versions available dependent upon starting requirements, speed 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) Industries

	HIGH SPEED	LOW SPEED
Poles	4, 6	8 to 40
Power	1 MW to 100 MW	1 MW to 30 MW
Voltage	3300 to 16000V	
Cooling	IEC: IC01, IC611, IC81W, IC91W, NEMA: TEAAC, TEWAC, ODP, WPI-II, DUCT-VENTILATED	

APPLICATIONS

Motors: 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

Double Fed Induction Generator

DFIG Wind Generators FOR WIND APPLICATIONS

INDUCTION GENERATORS

Technical Data

DOUBLY FED INDUCTION GENERATOR

- Power range: up to 4 MW
- Voltage: up to 13.8 kV
- Frequency: 50 & 60 Hz
- Operating speed: up to 2200 RPM
- Efficiency: >96%

SQUIRREL CAGE INDUCTION GENERATOR

- Power range: up to 6 MW
- Voltage: 690V, 3.3kV
- Operating speed: up to 1800 RPM
- Efficiency: >96%

Our Success

- Since 2002
- Leading supplier for Brazilian market, serial production commenced in 2015
- Proven Wound Rotor Machine Design
- Leading power density

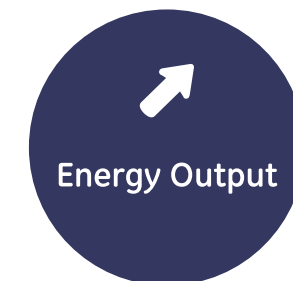
- Proven products in harsh marine and industrial environments.
- Robust and simple rotor designs.



Our generators are designed and manufactured to operate efficiently and reliably in challenging applications and severe environments.

We help to reduce levelized cost of electricity with:

- High electrical efficiency across a broad generating power range
- Optimized systems solutions incorporating our range of full and partial power converters
- Using components proven in diverse industries
- Ease maintenance enabling lower operation & maintenance cost
- Noise levels as low as 77dBA* can be met to help reduce cost for the overall system whilst reducing environmental impact. [*Achievable in closed type machines with operating speeds up to 1200 rpm]



Energy Output



System Cost



Operation & Maintenance Cost

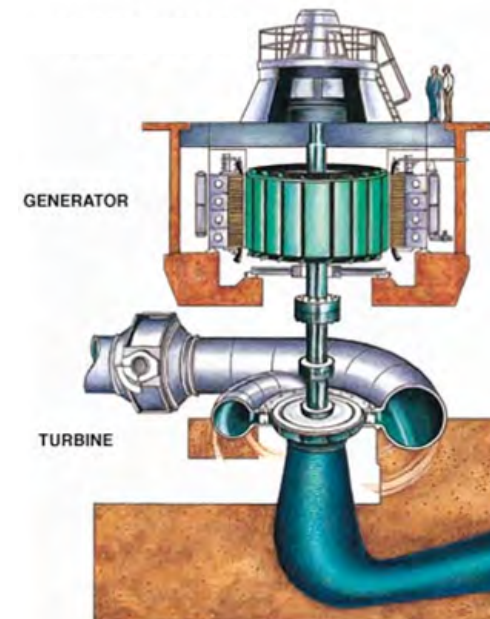
High Speed Synchronous Generators

4&6 POLES

Small Hydro Generators

HORIZONTAL & VERTICAL

HIGH EFFICIENCY MACHINES



HIGH PERFORMANCE

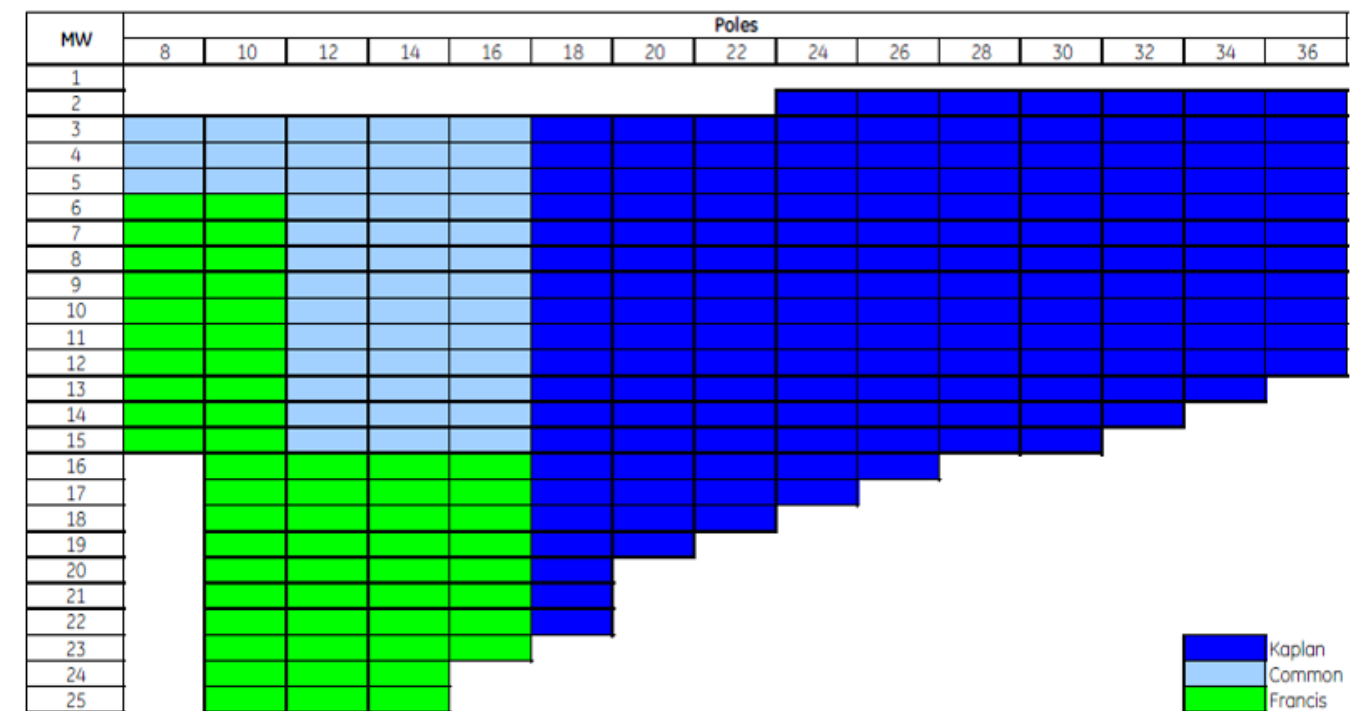
- GE synchronous generators are legendary for their efficiency and reliability.
- Modular construction concept, using the latest design and manufacturing techniques, including Vacuum Pressure Impregnation (VPI) insulation System and the GE Pin Vent stator technology.
- Large high speed generators are designed with a single forged shaft for maximum strength and stiffness to provide a long life.
- Laminated rotor construction available up to 10MW with star punching design (salient poles and magnetic ring punched out in one single piece).

HIGH SPEED GENERATOR MACHINE DATA	
Frame Size	630 and above
Poles	4&6
Frequency	50 or 60Hz
Cooling	IEC: IC01, IC611, IC8IW, IC9IW, NEMA: WPI - II, TEAAC, TEWAC
Power	2MW to 100 MW
Voltage	3300 to 16000 V

KEY FEATURES & BENEFITS

- High efficiency
- High thermal capacity.
- Reduced mechanical stress
- Low vibration levels
- Easy rotor maintenance
- Fewer components (integral pole design)

MECHANICAL MACHINES: STEAM OR GAS TURBINES



TECHNICAL DATA	
Power	2 to 25 MW

■ Kaplan
■ Common
■ Francis

DC Motors

Direct Current Machines

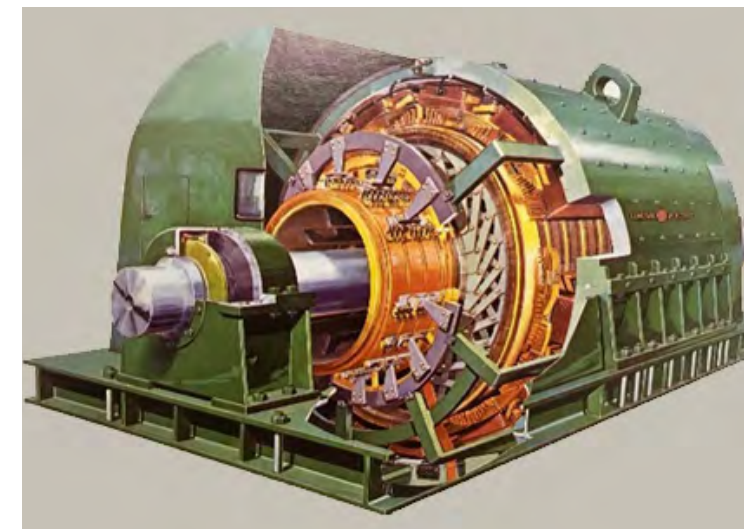
INDUSTRIAL APPLICATION – PRODUCT RANGE



100 HP to 3000 HP
300 RPM to 1500 RPM
250 V to 700 V

Paper, Ventilation, Rubber, Excavator,
Hoist, Etc.

METAL MILL APPLICATION – PRODUCT RANGE



100 HP to 8000 HP
30 RPM to 900 RPM
500 V to 1000 V

Rougher, Finishing, Edger, Rolls, Etc.

Certification & Testing

CERTIFICATIONS

- OFF SHORE (ABS, DNV, BV, LLOYD'S)
- HAZARDOUS LOCATIONS (NEMA / NEC & IEC STANDARDS)
- COUNTRY-SPECIFIC CERTIFICATIONS (INMETRO for Brazil, BASEEFA for Europe, GOST for Russia, CSA for Canada, RETIE for Colombia, Etc.)

MAIN TEST FACILITY

Area: 19K+ sq ft
 Lifting Capacity: 150 ton
 Online Data Acquisition System
 Electronic Database & Reports



INDUCTION MOTORS

All power, voltage and polarity range
 Dual-frequency load test on all range
 Direct Load – 2000hp (2-pole) / 5,000hp (≥4-pole)

SYNCHRONOUS MACHINES

Temperature rise determination – IEEE 115 Method 4 or Method 3 limited to 10MVA @ 13kV
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Qualification in Services



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.



Services

Reducing risks, optimize productivity

WIND GENERATORS REPAIR

- GE Power Conversion Campinas has developed specific solutions for Wind market in order to reduce maintenance cycle time and guarantee equipment reliability.
- GE counts with specialized and experienced Engineering and Field Services for this market to perform Field Services (Uptower and Downtower), shop repair, long term agreement, spare generators as well Spare parts (e.g. brushes, brush holders, bearings, slip rings).
- This portfolio covers any type of Wind Generators such as DFIG or permanent magnet design manufactured by GE or any other equipment manufacturer.
- Campinas Site is one of GE Center of Excellence for new Wind Generators and all technology applied in the repairs follows most recent process and innovation used for new equipment.

FIELD SERVICES- UPTOWER

(for GE or Non-GE Equipment)

- Rotor Wye Ring retrofit*
- Electrical tests
- Partial winding repair
- Generator cleaning and overhaul
- Shaft machining
- Stator or rotor cables exchange
- Slip ring and bearings replacement

* GE PC patent

SHOP REPAIR

(for GE or Non-GE Equipment)

- Rotor rewinding
- Stator rewinding
- Rotor / Stator overhaul
- Motor / Generator power upgrade
- Parts replacement
- Electrical / Rotating tests
- Engineering Studies

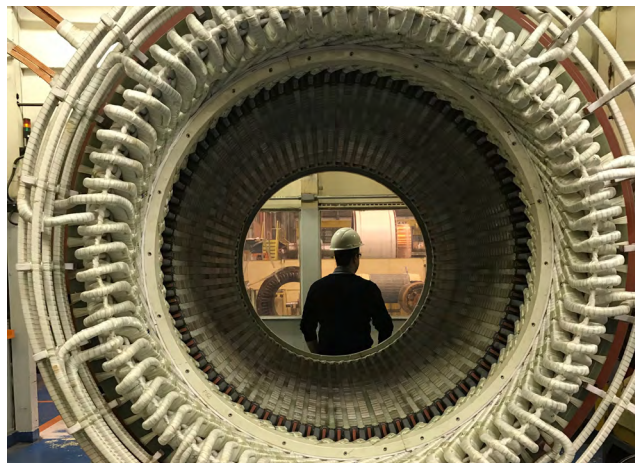
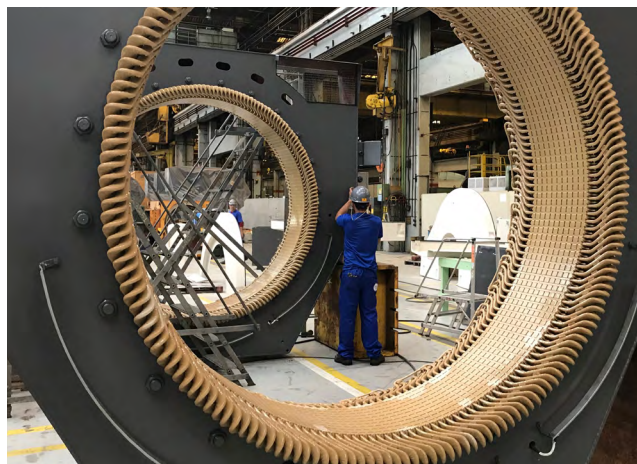
Motors & Generators Repairs

SERVICES

PREVENTIVE & CORRECTIVE SERVICES

GE Power Conversion – Campinas as Motors and Generators manufacturing center has a complete structure and services offering to repair Induction, Synchronous, Wound Rotors, Direct Current motors, Turbogenerators & Synchronous generators applicable in all Industry Segments such as Oil & Gas, Hydro, Biomass, Metals, Mining &, Wind. Our services portfolio is applicable for third party equipment.

GE counts on specialized and experienced engineering and field team to perform field and shop repair. All technology applied in the repairs follows most recent process and innovation used for new equipment.



Motors & Generators Repairs

SERVICES



SHOP REPAIR OFFERING

(for GE or Non-GE Equipment)

- Rotor rewinding
- Stator rewinding
- Rotor / Stator overhaul
- Parts replacement
- Electrical tests
- Engineering studies and evaluation of installed base for uprate opportunities
- Improvement in efficiency through rewinds or replacement components
- Retrofits, uprates and replacement stators, rotors and Renewal Parts
- Providing coil design for direct rewinds in the service shops
- Mechanical components for repairs and refurbishments

FIELD SERVICES OFFERING

(for GE or Non-GE Equipment)

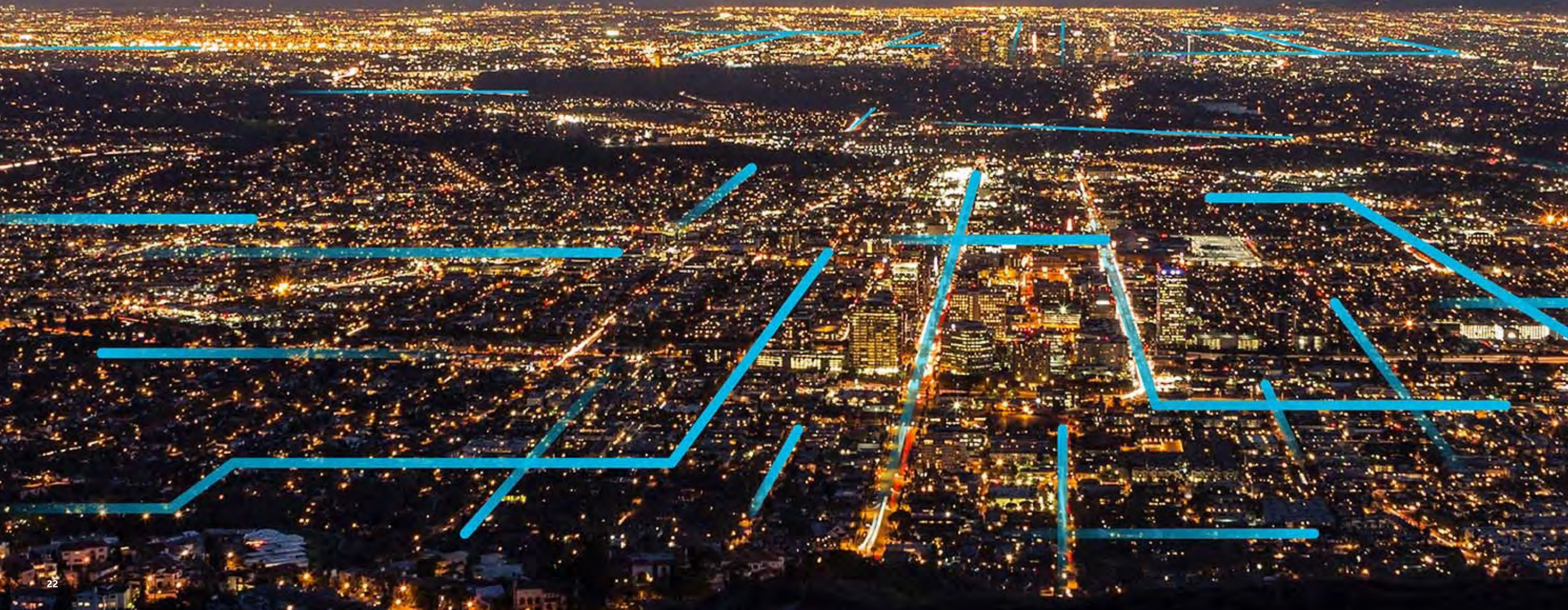
- Assembly, Installation & Commissioning
- Electrical tests
- Complete rewind – resin rich coils
- Partial winding repair
- Cleaning and overhaul
- Bearing, Conduit box and/or Accessories replacement
- Vibration measurement and analysis
- On site machining

Contact Us

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About GE Power Conversion

GE's Power Conversion business, a business unit of GE Power, applies the science and systems of power conversion to help drive the electric transformation of the world's energy infrastructure. It does so by designing and delivering advanced motor, drive and control technologies that evolve today's industrial processes for a cleaner, more productive future. Serving specialized sectors such as energy, marine, renewables and industry, through customized solutions and advanced technologies, GE Power Conversion partners with customers to maximize efficiency. For more information, please visit www.gepowerconversion.com

About GE

GE (NYSE: GE) is the world's Digital Industrial Company, transforming industry with software-defined machines and solutions that are connected, responsive, and predictive. GE is organized around a global exchange of knowledge, the "GE Store," through which each business shares and accesses the same technology, markets, structure, and intellect. Each invention further fuels innovation and application across our industrial sectors.

With people, services, technology and scale, GE delivers better outcomes for customers by speaking the language of industry.

Imagination at work

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