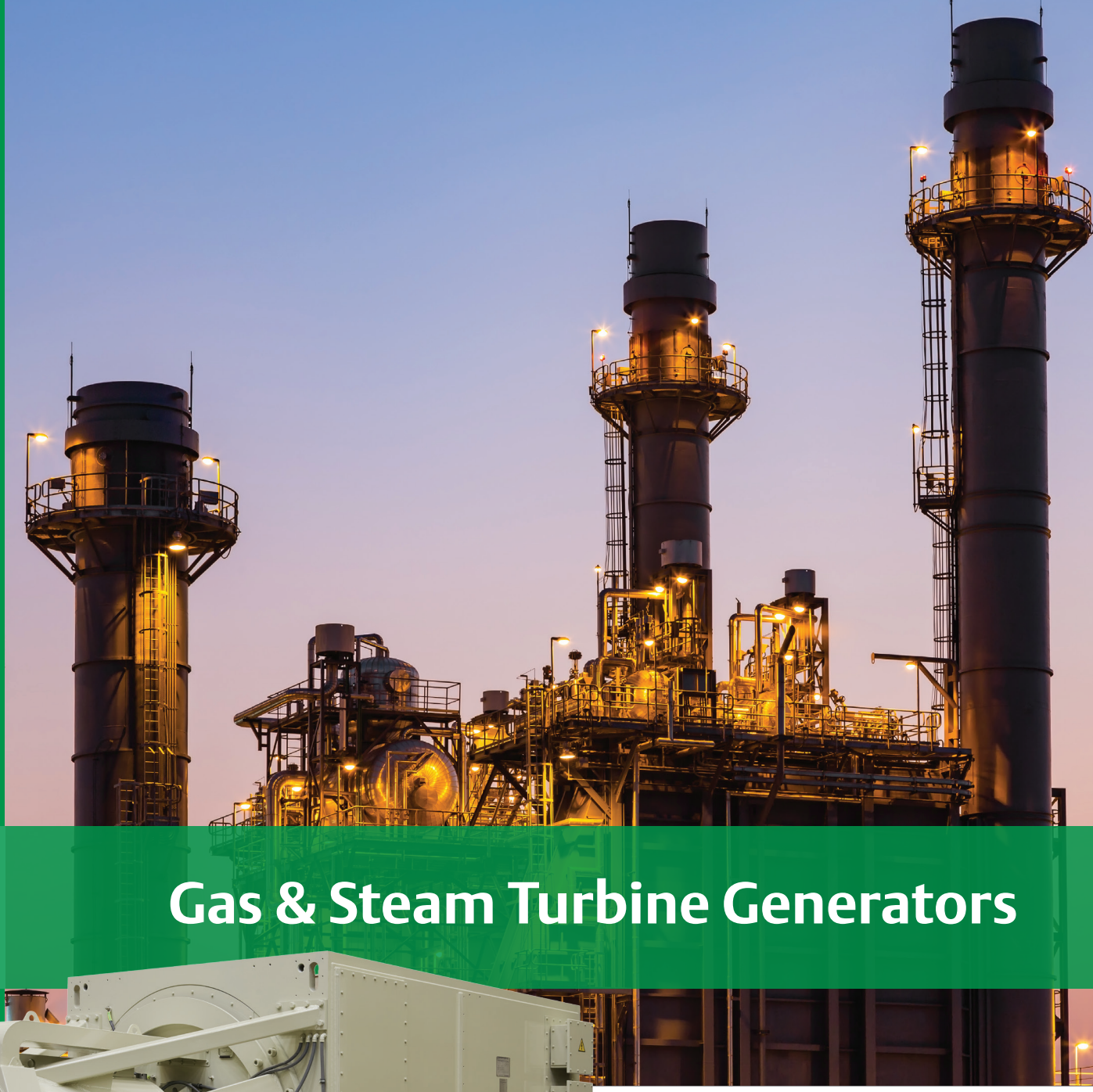
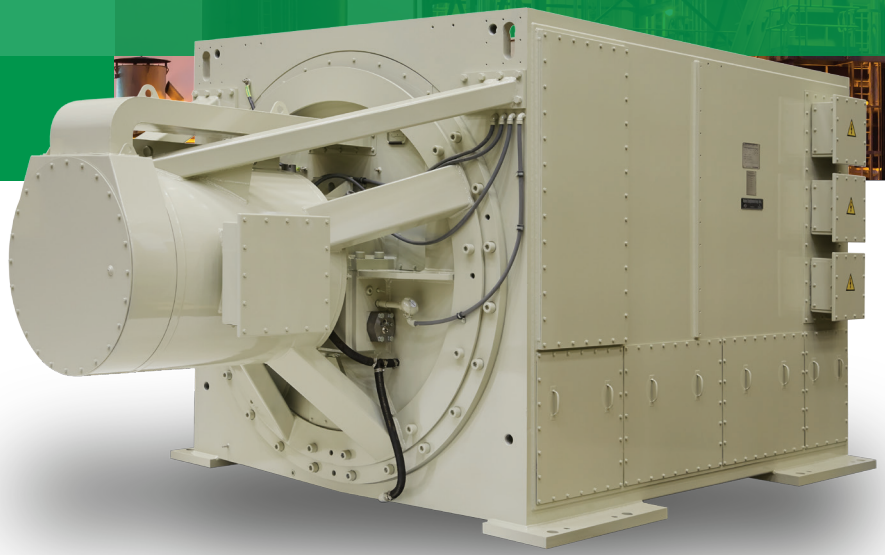


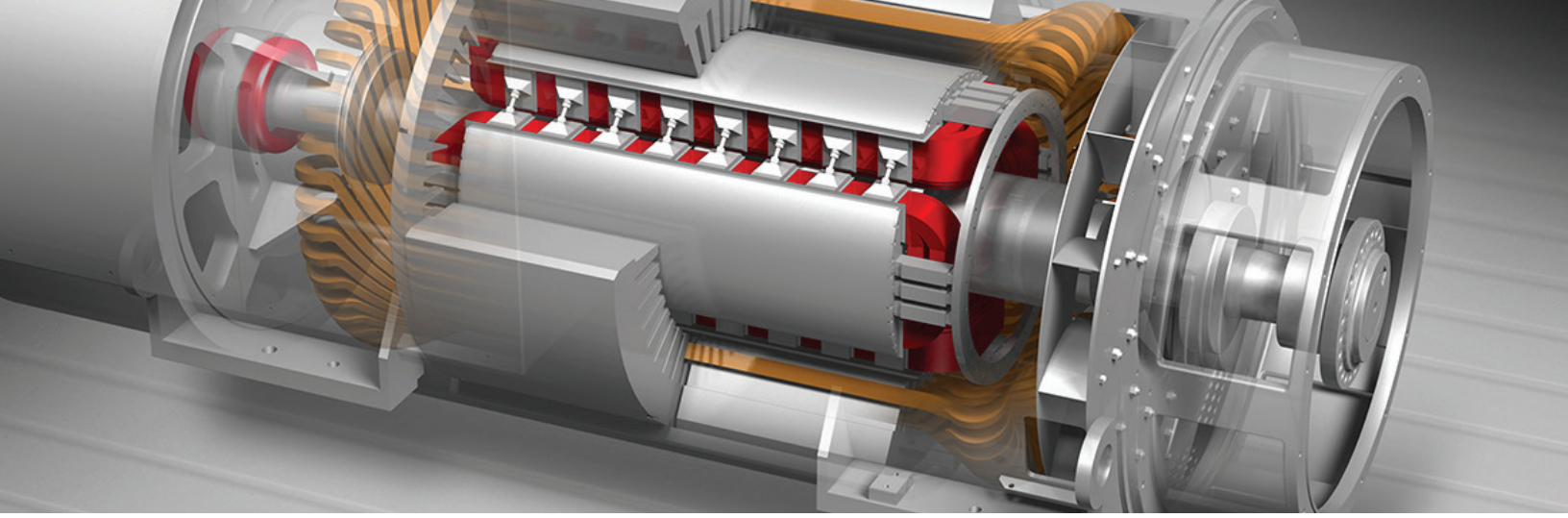
Gas & Steam Turbine Generators



100 kW to 25,000 kW

Nidec
All for dreams

LEROY-SOMER™
KATO ENGINEERING™



Rugged, Reliable Generators up to 25 MW

Kato Engineering designs and manufactures a complete range of gas & steam turbine synchronous alternators for applications requiring 100 kW to 25,000 kW output. With knowledge of the power requirements for oil and gas, industrial utility, and combined high horsepower applications is built on a history of global experience supplying prime and emergency power solutions. Kato Engineering's reputationengineering consultants and end users alike.

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We know your application is unique, and so are the solutions we supply. Our engineers work with you to design the alternator that while taking into consideration the rigors and demands of gas and steam turbine applications in harsl environments.

KATO DIFFERENTIATORS

- Kato Engineering turbine designs emphasize high efficiency, lower operating costs, and reduced downtir
- High grade magnetic steel is used to minimize core loss due to hysteresis and eddy currents
- Stiff construction, sleeve bearings and a circulating oil system minimize vibration and boost turbine generator reliability
- Mica turn-taped magnet wire provides more than 50 percent better instantaneous surge capacity over glass-covered magnet wire to prevent shorted or grounded windings
- Our vacuum-pressure impregnated (VPI) epoxy system protects against premature winding failure in harsh environments

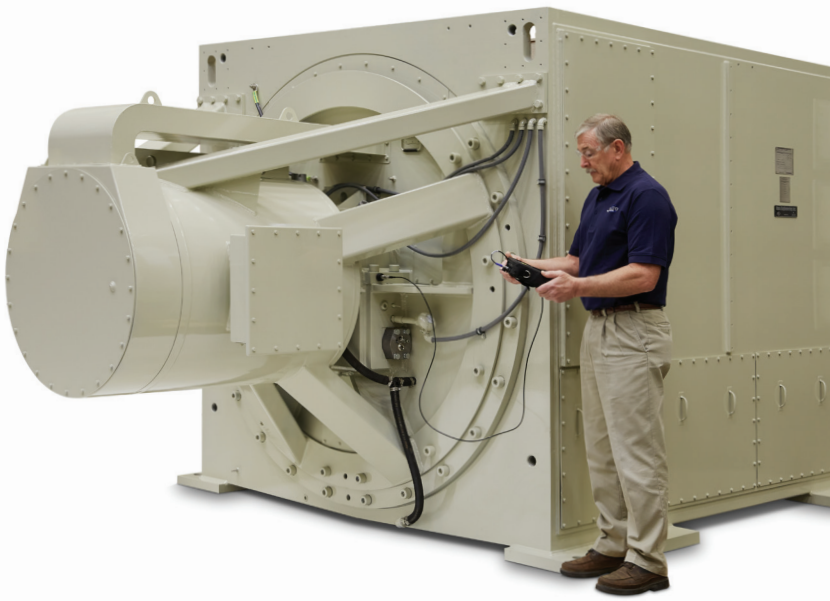
COOLING AND ENCLOSURE OPTIONS

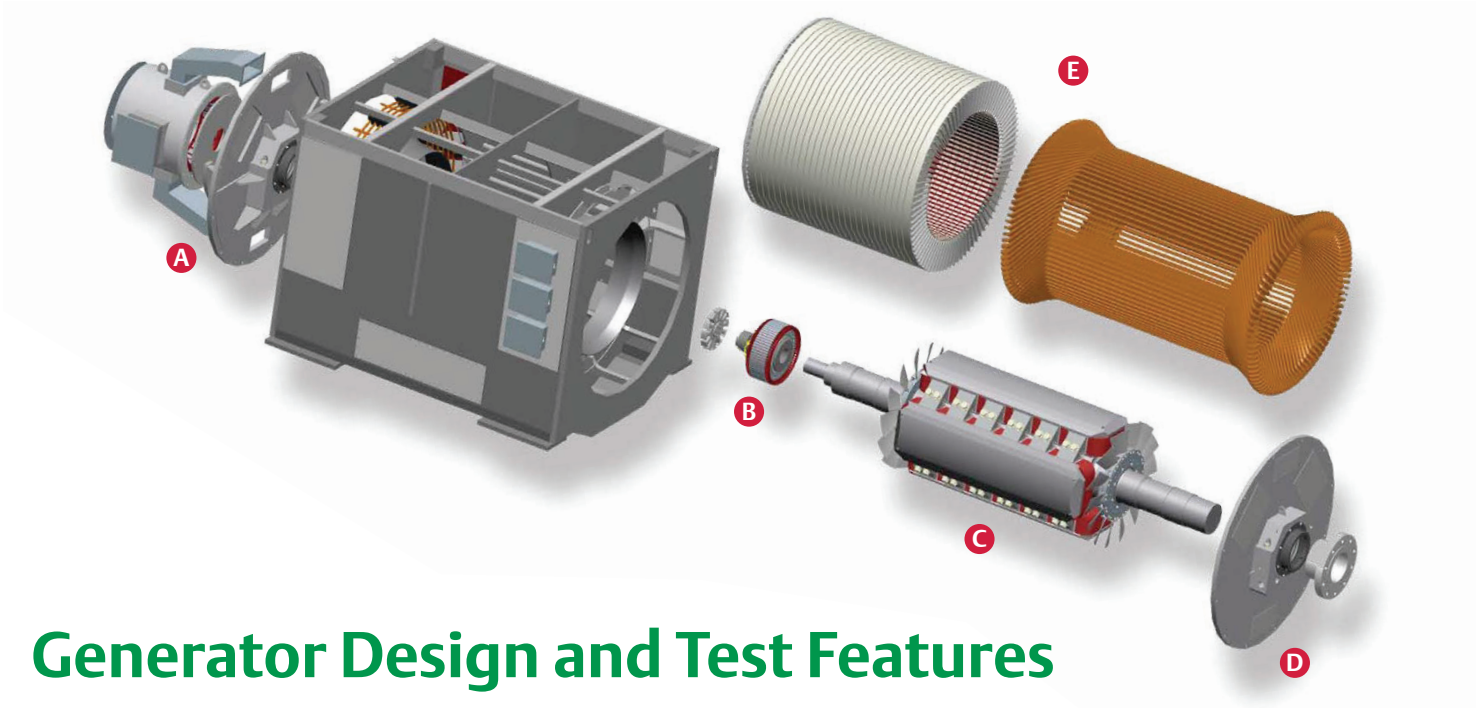
Kato Engineering provides a full range of turbine alternator enclosure options to meet your custom applications; from open machines (IP20) up to totally enclosed units (IP56).

Cooling options include:

Totally Enclosed Air-to-Air Cooled (up to IP56) – Totally units are equipped with one or two internal fans to direct the enclosed air up and through stainless steel tubes mounted directed through an outer enclosure to cool the tubes and air is then exhausted on the opposite side of the generator.

Totally Enclosed Water-to-Air Cooled (up to IP56) – the generator enclosure where the heat created from the generator is extracted by cool water from the radiator coils.





Generator Design and Test Features

With more than 50 years of design and testing standards experience, our knowledgeable turbine alternator engineering group will work with you to meet your customized requirements and exact specifications forall of your applications.

A B EXCITATION SYSTEM

- Sustained application overload conditions
- Short circuit current capacity of 300% for ten seconds
- Oversized diode assembly and optional redundancy
- Regulation better than or equal to ± 0.25%

C ROTOR DESIGN

- Depending on the machine size and speed, the rotor is either stacked laminated high-grade steel shrunk fit onto a shaft or forged solid steel
- Coils use glass coated magnet wire with 100% epoxy impregnation

D BEARING DESIGN

- Rolling bearing (sealed or regreasable) or sleeve bearing design

E ELECTRICAL INSULATION SYSTEM

- Class H (180° C) insulation in all windings and rotor assemblies
- Optional design to pass the NEMA MG1 sealed winding insulation water test
- Designed to provide 200,000 hr operational service life for Class B 120° C temperature rise
- Form-wound coils with glass coated magnet wire and 100% solid epoxy VPI
- Fully wrapped coils with mica insulation have semi-conductive and conductive tape to minimize partial discharge on high voltage machines
- Armored tape is applied at each end-turn
- Robust bracing system installed to protect against coil movement caused by current spikes and higher harmonic frequencies
- Epoxy overspray on windings for additional protection against harsh environments

TESTING

- Extensive testing capabilities per IEEE115 and IEC60034. This includes up to 40 MVA load and five dedicated test bays equipped with digital acquisition systems for electrical, thermal and vibration data collection and analysis. Connection available for remote testing supervision.

SPECIFICATIONS

Power	100 kW - 25,000 kW
Voltage	400 V to 15,000 V
Speed	1500 rpm/50 Hz, 1800 rpm/60 Hz
Standard Power Factor	0.8 lagging to 0.95 leading
Special Power Factor	Upon request
Enclosures	Up to IP56, ODP, TEWAC/CACW, TEAAC/CACA, WPI, WPII, DIDO
Insulation	Complete Class H epoxy VPI insulation system
Winding	Form Wound
Excitation System	Brushless with PMG
Standards/Compliance	NEMA, IEEE, IEC, API546, CE marking, CENELEC
Certifications Available	All marine agencies, USCG, CSA, UL, IECEx, ATEX, Hazardous locations
Quality Assessment	ABS, DNV GL, QAR, QAN, CSA, UL, ISO 9001

katoengineering.com

WORLD-CLASS CUSTOMER SERVICE

Kato Engineering has skilled specialists available to assist customers 24/7 every day of the year, and offers a wide array of aftermarket support services that include:

- Equipment Installation, Commissioning & Start-Up
- Preventative & Scheduled Maintenance
- Troubleshooting & Repairs
- Genuine KATO™ Aftermarket Parts
- Complete Remanufacturing Capabilities

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