



Oil & Gas Energy Solutions



Power Generation
Expertise for the
Oil & Gas Industry

Nidec
All for dreams

KATO ENGINEERING™

Power Solutions for the Oil and Gas Industry



Nidec Electric Power Generation was built on the experience and reputation of our Kato Engineering™ brand. Kato Engineering™ provides power generation expertise and solutions to major players in the oil and gas industry – from producers, refiners and construction companies, to engineering consultants.

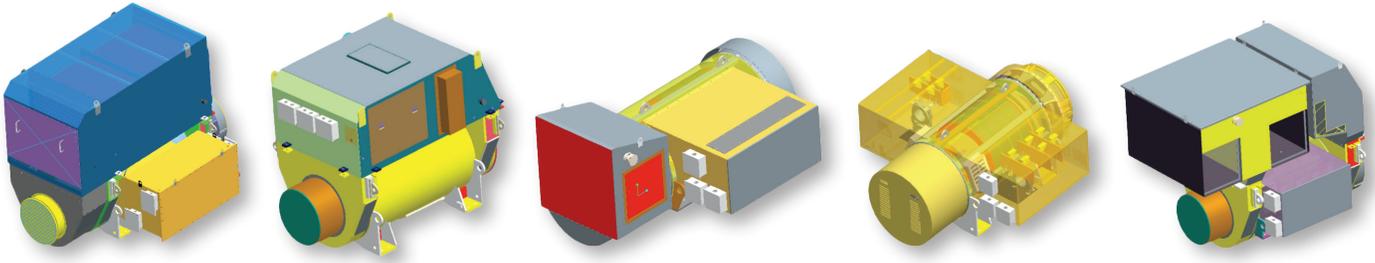
Our in-depth knowledge of the power requirements for drilling, production, processing and transportation comes from extensive experience supplying prime and emergency power solutions for virtually all oil & gas applications, including:

OFFSHORE INSTALLATIONS

- Fixed Platforms
 - Accommodation Platform
 - Central Processing Platform
 - Central Processing Facility
 - Quarter Platform
 - Unmanned Installations
 - Wellheads
- Floating Production Platforms
 - Floating Production Storage Offloading
 - Floating Liquefied Natural Gas
 - Semi-Submersible Drilling Rigs
 - Jack-up Rigs
 - Spars
- Emergency Fire Suppression

ONSHORE INSTALLATIONS

- Wellheads
- Petrochemical Refineries
- Liquefaction and Regasification Terminals
- Emergency Fire Suppression
- Storage and Transportation
 - Pipelines
 - Compression Stations
 - Tank Farms
 - Terminals
 - LNG and Crude Oil Carriers
 - Seismic Vessels
 - FSRU
 - Receiving Terminals
 - Loading Stations



One base generator, five different customer solutions

LONG LIFE CYCLE/ LOW MAINTENANCE

Oil and gas operations running offshore or remotely on land without power grid access depend on a reliable, lasting on-site power supply. Our systems are designed with this critical need in mind:

- Generator cores built to minimize core loss and heating.
- Copper amortisseur windings to lessen damper cage heating caused by non-linear loads.
- Mica turn-taped magnet wire in the stator form coils provides nearly twice the instantaneous surge withstand capacity, compared to glass-covered wire. Windings comply with industry standards, including IEEE 522 and IEC 35-15.
- Opposite-drive end bracket insulator between the sleeve and bearing to avoid shaft currents flowing through the bearing which can damage the bearing surfaces.

DEPENDABLE, EVEN UNDER SEVERE CONDITIONS

Drilling rigs operate in harsh environments and contend with wide temperature and humidity swings, and corrosive salt air on offshore rigs. These conditions, combined with demanding continuous duty operation, often test a generator’s strength to the limit and require rugged equipment.

With our superior design engineering expertise and experience installing numerous onshore and offshore systems, we build generators specifically for these applications and provide the right solution for any circumstance:

- Proven 24x7 operation.
- Vacuum Pressure Impregnation (VPI) rotor and stator insulation systems provide better and more consistent protection in harsh environments over traditional dip and bake insulation methods.
- Precisely layered insulating tape ensures maximum insulation properties and optimum fit in the form coil slot to reduce premature failure in severe conditions.

GLOBAL AND CUSTOM DESIGN OFFERINGS

Modern rigs and other offshore vessels have more motors, control systems and electrical circuits than older installations and increased operation complexity.

Our ability to create both custom power solutions (for unique applications) or global designs (for ease of replacement) cater to these needs:

- Ability to design to specific specifications.
- Excitation systems support high load level variations with reduced voltage fluctuations.

GLOBAL CERTIFICATIONS AND STANDARDS

| | Kato Engineering |
|--|------------------|
| For hazardous location: | |
| ATEX or IECEx by notified body | x |
| IEC 60079-0 & -15 (Ex nA) | x |
| IEC 60079-2 (Ex p) | x |
| Class 1 Division 2 by NRTL | x |
| General certification | |
| North American NRTL certification | x |
| Insulation certified by UL per UL 1446 | x |
| ISO 9001 | x |
| Other stand alone standards: | |
| NEMA MG.1 | x |
| IEEE 115 | x |
| IEC 60034 | x |
| API-546 | x |
| Mil-Std-705 | x |
| CE (European Community) marking | x |
| NORSOK (for Norwegian Petroleum Industry) | x |
| GHOST (for Russia) | x |
| Marine regulation / certification: | |
| USCG (United States Coast Guard) | x |
| RMRS (Russian Maritime Register of Shipping) | x |
| CCS (China Certification Society) | x |
| KRS (Korean Register of Shipping) | x |
| ABS (American Bureau of Shipping) | x |
| DNVGL (Det Norske Veritas/German Lloyds) | x |
| RINA (Italy Registro Italiano Navale) | x |
| NKK (Japan Nippon Kaiji Kyokai) | x |
| BV (Bureau Veritas) | x |

Product features listed above will vary by product model.

Proven Reliability. Engineering Expertise. Quality Processes. Unending Innovation.

We have been a strong partner with key industry players to supply electric power generation for over 50 years. Whether your request is a trusted global design or highly engineered custom product, we can deliver the result you need. Here are a few reasons why we are the “go to” provider for generator solutions:

- Intimate knowledge of oil and gas market specifications & requirements.
- Engineering expertise to build to your custom specifications and unique application needs.
- Ability to test to these specifications and demonstrate compliance.
- Intensive in-process inspection to ensure consistent quality.
- Material traceability, process controls, documentation, and formal test reports are available to confirm compliance with specification requirements.
- Formal witness testing facilities designed and constructed to meet stringent petroleum industry requirements.



Alternators for Oil & Gas Applications

Kato Engineering designs and manufactures alternators up to 25MW.

Oil and gas projects typically require alternators in the 500kW-25MW range, including the following:

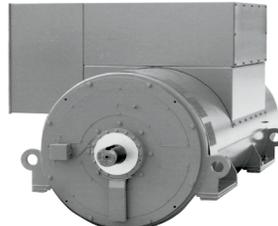
| KATO | | | |
|----------|-------|---------------------------|-----------|
| Model | Poles | Maximum continuous rating | RPM |
| 4P3.1 | 4 | up to 250 kW | 1500/1800 |
| 4P6 | | up to 1.7 MW | |
| 4P6.6 | | up to 2.2 MW | |
| 4P8.2 | | up to 2.6 MW | |
| 4P9.1 | | up to 4.1 MW | |
| 4P10.7 | | up to 6.8 MW | |
| 4P12.1 | | up to 9.5 MW | |
| 4P63 | | up to 11.5 MW | |
| 4P63.5 | | up to 14 MW | |
| 4P73 | | up to 22 MW | |
| 4P75 | | up to 25 MW | |
| 6P6 | 6 | up to 1.6 MW | 1000/1200 |
| 6P6.6 | | up to 1.6 MW | |
| 6P7 | | up to 2.9 MW | |
| 6P10.5 * | | up to 4.1 MW (50 HZ) | |
| 6P12.1 | | up to 8.0 MW | |
| 8P10.5 | 8 | up to 3.7 MW | 750/900 |
| 8P12.1 | | up to 5.6 MW | |



* Available only in 50 hz



4P3.1



6P6.6



4P75

EPG Onboard

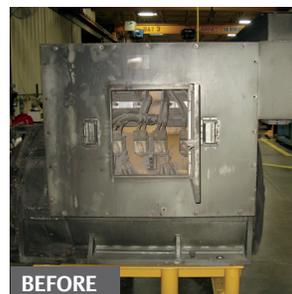
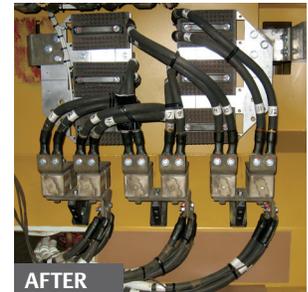
- 1 Blind Faith Subsea Development
Gulf of Mexico
- 2 Escravos Gas-to-Liquid Plant
Nigeria
- 3 Tahiti/Green Canyon
Gulf of Mexico
- 4 Oronite/Oak Point
Louisiana
- 5 Bullwinkle Platform
Gulf of Mexico
- 6 Bonga FPSO Vessel
Nigeria
- 7 Sarawak Oil Drilling Platform
Malaysia
- 8 Marlin TLP Drilling Platform
Gulf of Mexico
- 9 Sable Offshore Energy Project
Nova Scotia
- 10 Anchor Field
Gulf of Mexico
- 11 Edvard Grieg
Norway
- 12 Petronas FLNG
Korea
- 13 Kogas LNG Terminal
Korea
- 14 Ichthys LNG
Australia
- 15 CNOOC Drilling Platform
China
- 16 Nabors Drilling Rig
Argentina
- 17 Aasta-Hansteen Spar Platform
Norway
- 18 Nabors Drilling Rig
West Virginia



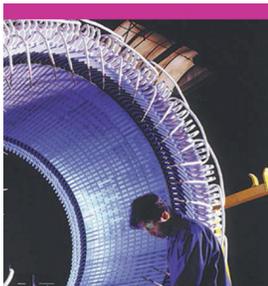
Factory Remanufacturing

As maintenance and capital investment budgets are scrutinized, many companies are beginning to recognize the value of refurbishing existing assets nearing the end of their life cycle. We offer cost-effective remanufacturing services to help you extend the useful life cycle of your alternator.

Improved processes, stringent quality checks and re-engineered supply chains return worn, end-of-life alternators to a like-new state with comparable performance. All remanufacturing is done at our facilities to ensure exact specifications and high workmanship standards are met. Remanufactured alternators leave with a new 12-month factory warranty on all replacement parts and rewinds.



Global Service & Support



Service Workshops



Field Service



Predictive Maintenance



Specific Services



Consultancy Service

- Bearing Replacement
- Rotor or Stator Rewinding
- Winding Impregnation using VPI Process
- Load Testing
- Training on Alternators and Regulators

- Inspection & Repair
- Alternator Cleaning and Drying
- Preventive and Curative Maintenance

- Vibration Analysis
- Partial Discharge Measurements
- Laser Alignment
- Thermographics
- Lubricant Analysis
- Investigation
- Remote Monitoring

- Installation & Commissioning
- Service Contracts and Extended Warranties
- Parts Distribution

- Energy Efficiency Audits
- High-efficiency Solutions
- Variable Speed Conversion
- Installed Base Management
- Training on Alternators and Regulators

Global Support

With a global manufacturing footprint of 10 factories and more than 470 service centers as well as knowledgeable sales staff located all over the world, we are available wherever you need us.



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2075 Howard Drive West
North Mankato, MN 56003
TEL 507-625-4011