



# Defense Products

Generators | Motors | MG Sets | Controls

**KATO ENGINEERING**™



*Kato Engineering received its first government contract in 1938: to furnish the original 31 U.S. Army flying fields with AC generators for ground instrumentation.*

## Serving the US Military for more than 80 years

### Generators and Controls

Deep inside dozens of ship's hulls, Kato equipment is at work supplying reliable prime or standby hotel power and power regulation.

### Motors

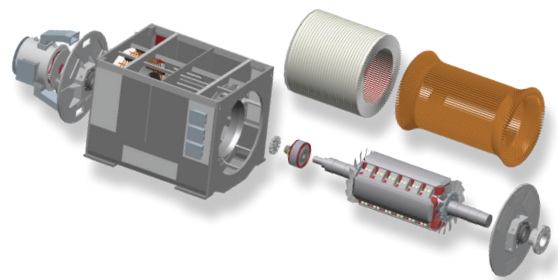
Kato motors provide dependable, efficient propulsion for Hybrid Electric Drive systems.

### Motor-Generator Sets

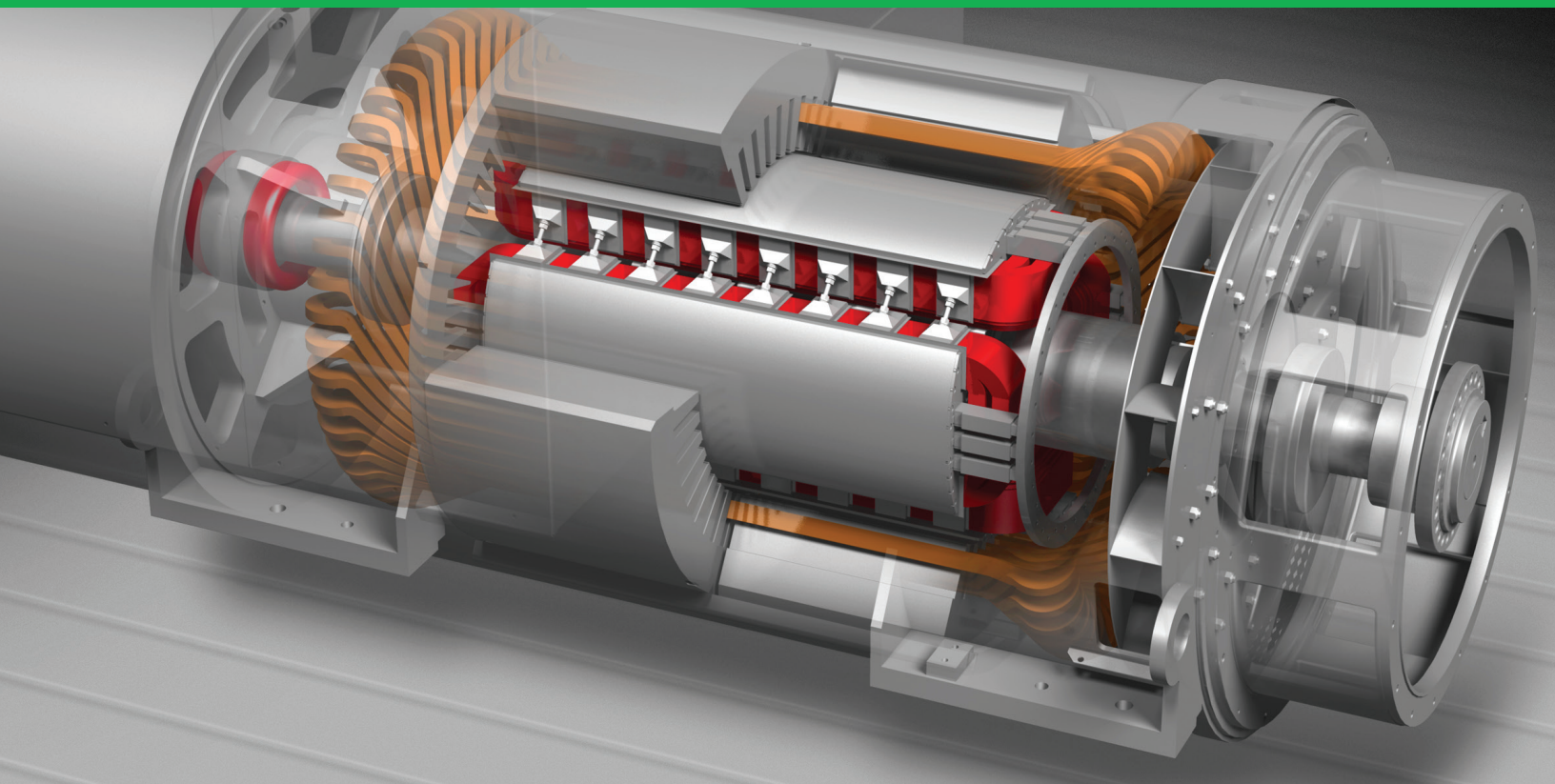
Our motor-generator sets and high-frequency generators provide line conditioning and frequency conversion for sensitive applications such as aircraft ground power, radar stations and computer centers. In government and defense buildings worldwide, Kato high speed motor-generators are a trusted source of emergency power. Kato high speed motor-generator sets are at the heart of Ford carrier class Electro Magnetic Aircraft Launching Systems (EMALS).

### Superior Design and Manufacturing

Kato Engineering has a world-class staff of professionals to support research & development, design, manufacturing and service activities. Kato utilizes engineering and project management resources, dedicated solely to defense and government projects, to ensure effective solutions and strict compliance to even the most difficult of electrical challenges. These resources, combined with our commercial business base, allow us to use the latest technology to provide a reliable product with an economical price. Kato is proficient in areas from manufacturing existing designs to developing new, cutting-edge technology. Also, Kato is there to partner in all phases of your project from providing technical information before the sale to final design.







## Pulse Power and Directed Energy Systems

With the future of naval weapon systems headed towards electrification, Kato Engineering is at the forefront of research, development and production of power solutions for directed energy systems. Our extensive experience in specialty energy storage systems allows for the design of future custom applications. Kato's current capabilities and projects include the development of energy storage and power generation for:

- Lasers
- Railguns
- Large energy storage magazines
- Electronic countermeasures
- High-powered radar







## AC & DC Generators for Ship Hotel Power

Kato's naval applications include launching platforms, fighting ships, support craft, research & survey vessels and submarines. These on-board Kato generators provide reliable emergency or complete vessel power, depending on the need.

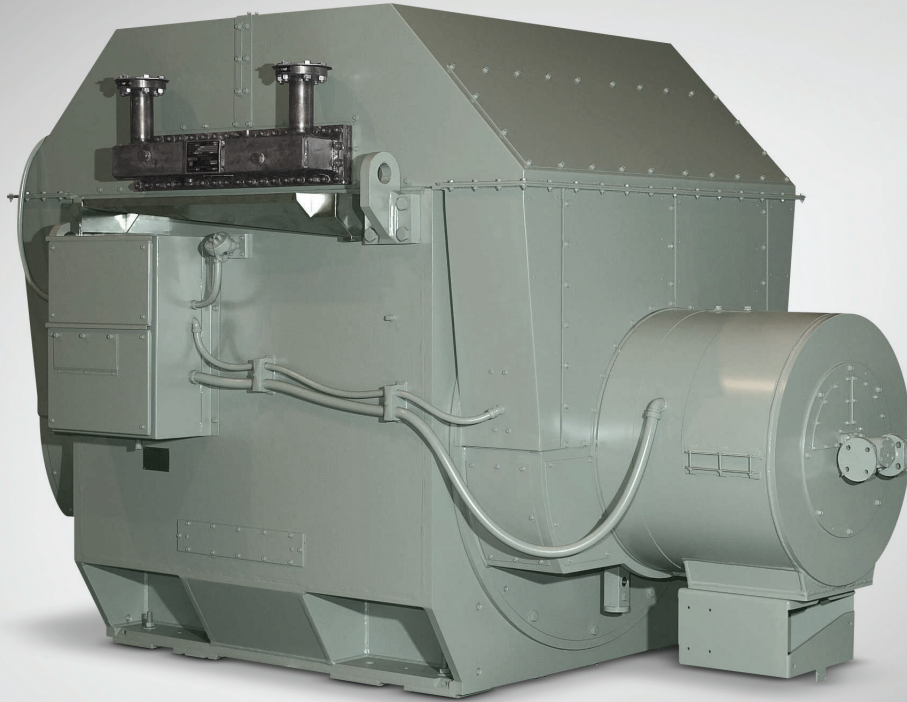
High-shock bearings and a rugged frame on Kato ship generators absorb and dissipate constant pounding dished out by turbulent seas.

Totally enclosed units are equipped with one or two internal fans. Air is forced up and through a large air-to-water radiator, which is within the generator enclosure. Air is continually re-circulated with the heat created from the generator being displaced by cool water from the radiator coils. The radiator consists of an inner tube of 90-10 copper-nickel for corrosion resistance and an outer tube to prevent water leakage.



*High-shock tests ensure the generator can withstand the force of an enemy attack.*





*Water-cooled generator for a typical Naval ship's prime power.*

## High-Voltage Insulation

The Navy's demand for greater power density has increased the need for generators with high voltage output. While 450 V was the standard for ship applications, 4160 V and 13.8 kV requirements are now common. In order to meet these demands, Kato Engineering has developed a new, high-voltage stator coil with class H insulation resin.

The coils are insulated in epoxy-bound mica/glass tape. A black carbon semi-conductive tape is applied on the straight section of the coil, located in the stator slot. This provides a void-free electrical connection between the ground wall insulation in the stator core to prevent partial discharges in the slot. Corona stress grading tape is applied on the end windings to provide electrical stress relief at the junction where the coil exits the slot.

Entire stator assemblies are immersed into liquid thermosetting epoxy resin insulation and vacuum pressure impregnated. The vacuum exhausts air, moisture and other vapors from the windings and permits complete penetration of the epoxy resins, filling voids and creating a rigid mass with optimum dielectric strength.



*From the laminations to the frames to the windings, generators are precisely designed and constructed for peak performance and a long operating life.*





*The US Coast Guard icebreaker “Cutter Healy” uses a Kato 60-60 Hz motor-generator set to provide clean power for sensitive equipment.*

## Motor-Generator Sets and 400 Hz Generators

### Motor-Generator Sets

Military forces around the world find Kato Engineering motor-generator (MG) sets and high-frequency generators a reliable source of power for line conditioning, load isolation and frequency conversion.

Ford class aircraft carriers utilize specialized, high-frequency Kato MGs to provide pulse power to the cutting-edge EMALS electromagnetic launching system.

Sophisticated electronic systems, such as computer centers, missile guidance systems and radar equipment use Kato motor-generator sets to block harmonics, line transients, phase unbalance and frequency fluctuations. On Navy and Coast Guard vessels, Kato MGs provide a power link between the ship’s main generators and sensitive navigational equipment. In seaports all over the globe, Kato motor-generator sets deliver economical power by converting shore frequency to shipboard frequency.

Long life, minimum maintenance costs, low harmonics, high overload capacities and many other features make motor-generator sets a clear choice over solid-state systems.

With input of 50 or 60 Hz, output frequencies of 50, 60, or 400 Hz are available as standard with other frequencies available up to 1200 Hz. Power capacities range from 10 kVA to 25,000 kVA and up, depending upon system requirements.

Large Kato MG sets provide the capability for the testing of next generation naval equipment, such as main propulsion variable-frequency drives and supercapacitors.

Controls for motor-generator sets can be unit mounted, wall mounted or free standing. Kato Engineering also offers a variety of lifting provisions, framing and enclosures.

### 400 Hz Generators

Kato Engineering offers a complete line of high frequency (400 Hz) generators. These units provide economical power for grounded aircraft’s navigational equipment, ground power and military support products.

### DC Power Production and Rectification

Kato Engineering has extensive expertise in DC rectification within the mining and rail industries. This experience positions Kato with the design practices needed to equip future naval MVDC systems.





*Kato Engineering provides power for many Navy vessels including aircraft carriers, destroyers, submarines and more.*

## Regulators

Kato Engineering also supplies both analog and digital voltage regulator systems for Navy vessels. Designed for specific applications and prime movers, these regulator systems meet the military EMI, high-shock, temperature and vibration requirements while maintaining precise control of the generator voltage at varying loads. Built with redundant circuitry, they can be designed for parallel operation with load-sharing capability, frequency-dependent voltage control, and performance in response to prime mover loading, as well as other features needed for specific applications.



*Kato Digital Voltage Regulator (DVR) for Naval applications.*

## Parts and Service

Kato Engineering experts understand the importance of our military customer's power needs. That is why you'll find experienced factory field service personnel on call 24 hours a day, every day of the year.

Besides repair and on-site rebuilding capabilities, Kato offers assistance with installation and startup as well as scheduled maintenance or training.

Kato Engineering stocks a variety of parts for quick delivery.

Kato Engineering also provides technical manuals in a variety of formats. These manuals include operation, maintenance and illustrated parts breakdown.

Our knowledgeable and friendly staff is always ready to answer your questions, send a needed component or arrange a site visit anywhere in the world.



# Kato Engineering Powers America's Navy

## AIRCRAFT CARRIERS



Nimitz Class



Ford Class

## ASSAULT SHIPS (LHA)



America Class



Wasp Class

## GUIDED MISSILE DESTROYERS (DDG)



Arleigh Burke Class



Zumwalt Class

## ATTACK SUBMARINES (SSN)



Seawolf Class



Los Angeles Class



Virginia Class

## LITTORAL COMBAT SHIPS (LCS)A



Independence Class

## BALLISTIC MISSILE SUBMARINES (SSBN)



Columbia Class

## TRANSPORT DOCKS (LPD)



Austin Class



San Antonio Class

## DRY CARGO SHIPS (T-AKE)



Lewis and Clark Class

## DOCK LANDING SHIPS (LSD)



Whidbey Island Class



Harpers Ferry Class

## FAST COMBAT SUPPORT SHIPS (T-AOE)



Supply Class

## U.S. COAST GUARD



Polar Class



Great Lakes Class



Legend Class

## OCEAN SURVEILLANCE SHIPS (T-AGOS)



Victorious Class



Impeccable Class

## OCEANOGRAPHIC SURVEY SHIPS (T-AGS)



Pathfinder Class

**KATO ENGINEERING**<sup>TM</sup>

**Nidec**  
All for dreams

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