Four-Pole Synchronous Generators / Turbine Generators

Four pole generators, often referred to in the industry as turbine generators are used in applications where a high speed turbine (gas, steam, expander) drives the generator, typically through a speed reducing gearbox. The rotating speed delivered to the 4-pole generator needs to be 1500 RPM (50 hertz) or 1800 RPM (60 hertz).

Uses and Markets

- Oil and Gas
- Industrial Power Generation
- Cogeneration
- Geothermal

HIEC's 4-pole Synchronous Generator Output Range

- 2,500 to 15,000 kW (Laminated Rotor Construction)
- 15,000 kW to 25,000 kW (Solid Forged Rotor Construction)
- 380 to 13,800 Volts
- 50 or 60 Hz, 1500 or 1800 RPM

Four-pole Synchronous Generator with TEWAC enclosure prior to final assembly

Mechanical Features

Hyundai Ideal Electric Co.'s four-pole synchronous generators are designed with rugged and conservative construction methods that greatly enhance reliability and service life.

Rotor Construction

Hyundai Ideal Electric Co.'s four-pole design uses integral pole laminations, bolted and riveted together under high pressure before shrunk-fit and keyed to the shaft. This integral design is a far superior design as it eliminates the need to separately attach field poles or pole tips. The field coils are tension wound using insulated rectangular copper wire. Aluminum supports are spaced to secure the field coils under all operating conditions.

For our larger four-pole generators, a solid forged salient pole rotor construction is employed. This rotor design, which is stiffer and more mechanically stable than the smaller laminated style, allows us to build generators with output ratings up to 25 MW. Strap field coils are utilized with this rotor design.

The completed rotor assembly is dynamically balanced to our own standards, which are more stringent than most U.S. and international standards.

Bearings

HIEC's four-pole generators incorporate oil lubricated split-sleeve journal bearings. All bearings are designed for flood / pressure lubrication or self-lubrication, most are furnished with oil rings to provide bearing lubrication during emergency shut-down.

Enclosures

All enclosure types (ODP, WPII, TEWAC, TEAAC, etc.) are available with the 4-pole synchronous generator.

Electrical Features

Our custom engineered design philosophy allows us to meet any unique or specified machine performance requirement (optimizing generator efficiency, designing for special reactances, or minimizing waveform deviation and voltage harmonics).

◖ Sealed Insulation System

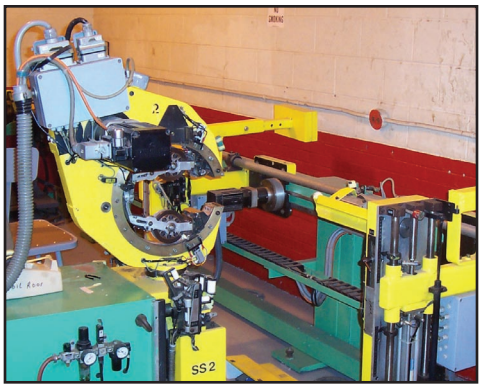
HIEC's standard insulation system includes Class F vacuum-pressure impregnation with polyester or epoxy resins. Both systems pass immersion and spray tests per NEMA 1-20.49.

Corona protection is provided as standard for stators above 6000 Volts.

◖ Excitation

Brushless excitation is by far the most popular choice. It combines low cost with performance suitable for nearly all applications, and eliminates the problems of brush wear and maintenance. Brush-type excitation is available if required.

Hyundai-Ideal Electric Co.'s brushless exciter design combines a high-frequency three-phase output with full wave rectification, which assures minimum ripple current and faster response. The rectifiers are mounted on a copper heat sink. Redundant fused rectifiers can be furnished for critical applications.



Computer controlled tape machine for installing half-lap insulating tape on stator coils.

A permanent magnet pilot exciter is typically furnished as an integral part of the exciter for use as a power supply to the voltage regulator. Using a permanent magnet pilot exciter in place of a power transformer provides the advantages of black start capability and forcing current under short circuit conditions.

◖ Voltage Regulators

HIEC offers a state-of-the-art electronic voltage regulator system as part of our brushless excitation package. Features such as VAR/Power Factor control, excitation limiting and motor operated controls are also available.

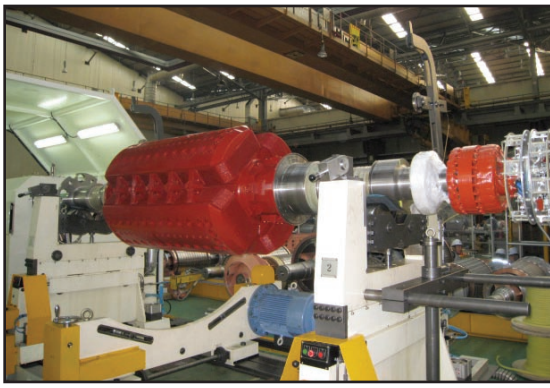
Industry Standards

HIEC manufactures generators to meet all current industry standards, including IEEE, ANSI, NEMA, API and IEC. Special certification is available through CSA, ABS, DNV, Lloyds and others upon specification.

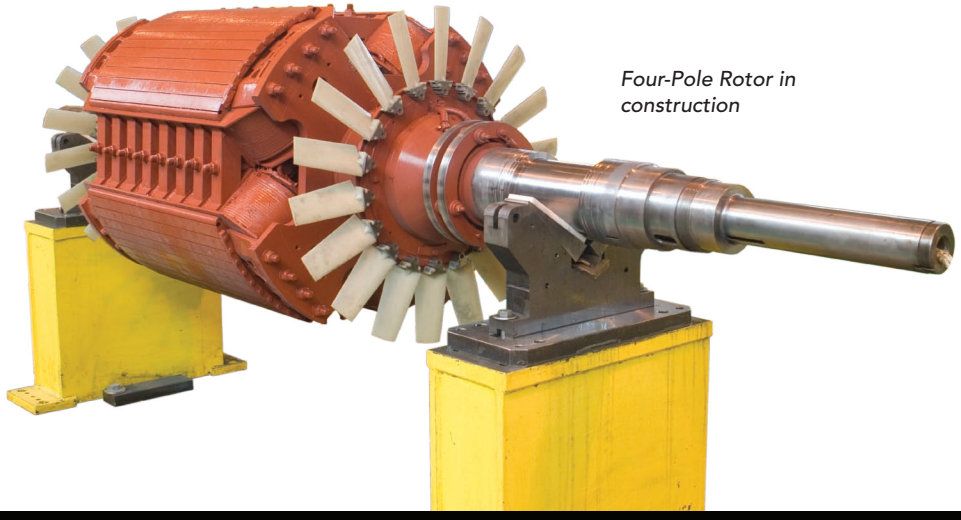
HIEC routinely designs motors for hazardous operation in Division 2 / Zone 2 environments with CENELEC / ATEX certification available.

For More Information

For more information on synchronous generators, or any other HIEC product, contact Hyundai Ideal Electric Co. headquarters or your local HIEC representative.



Forged Four-Pole Rotor



Four-Pole Rotor in construction

OUR MISSION

Our mission is to produce the highest quality product, satisfy customer requirements, and provide rewarding employment in a profitable growth environment, while supporting the community.

HYUNDAI IDEAL
ELECTRIC CO.
330 East First Street • Mansfield, OH 44902
phone 419.522.3611 • fax 419.522.9386

ISO 9001
Certificate Number 31576

www.IdealElectricCo.com