

# Low and Medium Speed

## SYNCHRONOUS GENERATORS

Ideal Electric has been a leading supplier of low and medium speed synchronous generators for engine-generator set applications for more than eighty years. Our experience and conservative design philosophy, combined with top quality materials and workmanship, lead to a rugged, reliable generator that is among the best available in the world.

### Benefits

#### ► Reliability

Hundreds of Ideal generators are installed in generator set applications around the world, proving their reliability day in and day out.

#### ► Efficiency

Our generator designs incorporate the best available technology, yielding a high efficiency machine that reduces operating cost and maintenance.

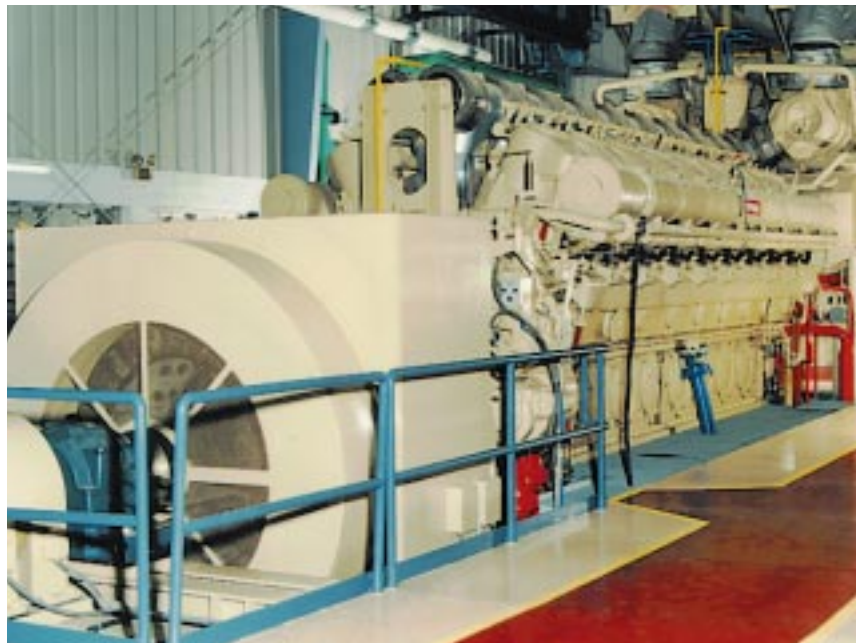
#### ► Single Source

Ideal Electric is the only company capable of producing both generators and switchgear in the U.S. This allows for sole sourcing of a coordinated electrical package.

#### ► Availability

A wide range of ratings is available:

- 1000 to 15,000 kW
- 400 to 15,000 Volts
- 50 to 60 Hz
- 1500 or 1800 RPM



*Low speed brushless generator at diesel facility.*

### Mechanical Features

Ideal low and medium speed salient pole synchronous generators employ proven construction techniques that greatly enhance reliability and service life.

#### ► Rotor Construction

A reliable rotor design begins with a conservatively sized forged steel shaft, which can be furnished with either an integral flange, or a straight shaft with keyway, suitable for attachment of a flexible type coupling.

The field pole laminations are high strength steel sheet, and are securely riveted under pressure. The field coils are tension wound directly onto the poles, using insulated rectangular copper wire.

The wound poles are attached to the spider by one of two methods, depending upon speed. Low speed generators utilize a fabricated steel spider with bolted-on poles. Medium speed machines employ a laminated spider and dovetail pole attachment.

Aluminum supports are used to secure the field coils under all conditions of operation and the rotor assembly is shrunk and keyed to the shaft. The completed rotor is dynamically balanced to Ideal standards, which are more stringent than those of most U.S. and international standards.

#### ► Bearings

Ideal low and medium speed generators incorporate split sleeve journal bearings as our standard design, either end-bracket or pedestal mounted.

These bearings employ a heavy bronze shell with a centrifugally cast babbit lining.

All bearings are designed for self-lubrication via oil rings, and conservative bearing load limits and peripheral speeds assure cool operation and long life.

#### ► Enclosures

The most commonly used enclosures for engine-generator set applications are open with top air discharge and open dripproof. These



*Ideal Electric...in sync with your needs*

designs are the lowest cost, and are suitable for most indoor applications.

Cooling air is drawn in by fans on each end of the rotor and is discharged out the top or sides of the frame.

Filters can be furnished on self-ventilated generators as conditions dictate, and generators can also be arranged for external forced ventilation through ducting.

For severe environments, totally enclosed generators with air-to-water heat exchangers are available.

## Electrical Features

A conservative electrical design is an essential element in producing a generator that will provide many years of trouble-free service.

Our engineers optimize every design to not only meet all performance requirements, but also to maximize efficiency while minimizing waveform deviations and voltage harmonics.

Many customers specify a Class B temperature rise, which further increases efficiency and overload capability with only a modest increase in cost.

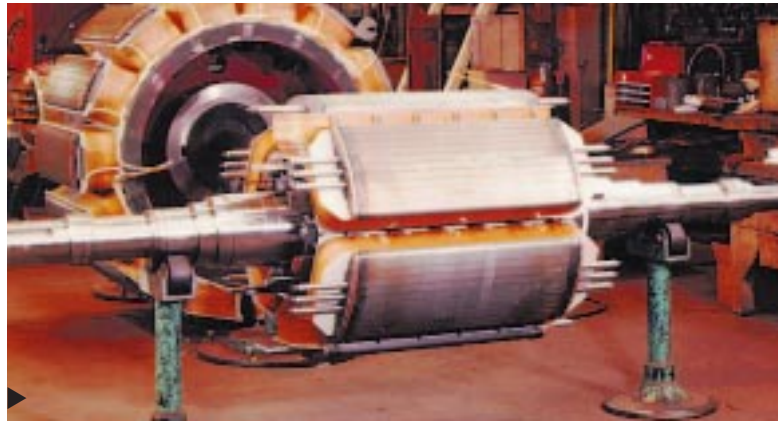
### ► Insulation Systems

Ideal'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 Systems

Brushless excitation is the most popular choice for low and medium speed synchronous generators. It combines lower cost with performance suitable for nearly all applications, and it eliminates the problems of brush wear and maintenance.

Ideal's brushless exciter design combines a high-frequency, three-phase out with full wave rectification, which assures minimum ripple current and faster response. The rectifiers are mounted on a copper heat



*Low speed spider and medium speed rotor assembly.*

sink, and redundant fused rectifiers can be furnished for critical applications.

A permanent magnetic pilot exciter can be furnished as an integral part of the exciter, for use as a power supply to the voltage regulator. The use of a permanent magnetic pilot exciter in place of a power transformer allows black start capability and forcing current under short-circuit conditions.

For those applications requiring ultra-high performance, such as severe motor starting duty, full static excitation systems can be supplied.

### ► Voltage Regulators

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

## Testing

Every generator we build is tested in accordance with our standard test procedures, which are far more rigorous than the requirements of NEMA MG-1. A complete test, including temperature rise and efficiency in accordance with IEEE procedures, is performed on all new designs or by customer request.

## For More Information

For more information, contact Ideal Electric headquarters or your local Ideal Electric representative.

## 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.



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