Motors

Pegasus™ MHV

Medium Voltage
AC Induction Motors

NEMA Frames 8200-8400
500-7000 HP
IEC Frames 400-500
400-5000 kW

Experience Matters

We've manufactured motors for over 125 years.

In 1879, GE founder, Thomas Edison constructed the first electric motor for a 110 to 120 Volt line at Menlo Park, NJ. This device still exists and is operative! It is located in the Edison Historical Collection in New Jersey.

Since 1987, GE has produced over 15,000 medium/high voltage machines. We've been a certified ISO 9001:2000 Quality System since 1992. Six Sigma processes have been hardwired into our organic functions since 1995. And now we presently offer a full range of large motors and generators up to 100,000HP (75,000KW).

Applications & Standards

These motors are commonly used in the petrochemical, power generation, water & waste water industries for centrifugal compressors and blowers, boiler feed pumps and multi-stage high pressure pumps such as water injection or pipeline applications.

GE Motors can hold to these standards and certifications: NEMA, IEC, CSA, API 541 & 547, ATEX, GOST, ABS, DIV 2, Ex-n for Zone 2

More compact, energy-efficient machines have less life-cycle costs and better payback for your investment

Optimized electro-magnetic designs and an improved ventilation/cooling system

- Increased motor output per frame size

Redesigned rotor and stator cores, air baffles and frames

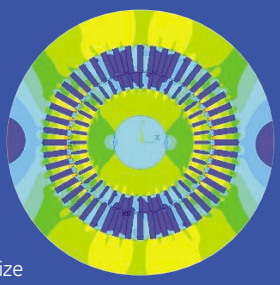
- Better efficiency from optimized airflow with minimal pressure drop

Redesigned fans

- Better efficiency from dramatically reduced windage loss

More compact machine sizes

- Equipment suppliers can save on packaging and transportation costs



Compactness and energy efficiency are achieved through the use of FEA (Finite Element Analysis) to optimize magnetic flux densities. This allows us to reduce stator and rotor core size.

Superior Design

Ventilation and Cooling

A new design was developed to improve heat exchange with a low-pressure drop.

- A new internal fan was developed to match internal airflow requirements.
- For TEAAC enclosures a new external fan design was developed to match cooler characteristics and reduce noise.
- Heat is dissipated much more efficiently due to a redesign in the internal air flow circuit configuration which increases the heat exchange area and air flow.

Low Vibration

A dramatic reduction in vibration due to design changes has been realized. The Pegasus™ MHV exhibits a low vibration, low thermal vector and slow roll, meeting API-541 requirements. This was due to a major focus on design and process improvements.

Inverter Duty / Reliability

VFD applications are best served by these machines with strict adherence to NEMA MG1 part 31 and IEEE-522 figure 2 (or figure 1 if requested). They include an insulated bearing and shaft grounding brush which decreases the possibility of circulating shaft currents.

Meets API 541 4th Edition for Petroleum & Chemical Applications

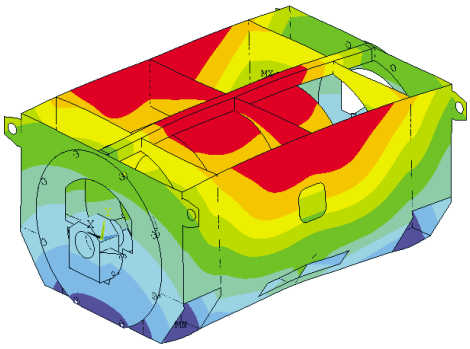
Vibration and total electrical/mechanical run out levels meet stringent API 541 4th Edition standards which translates to increased motor uptime and an improved overall reliability. A test system compatible with vibration sensoring methods, normally used in Oil & Gas applications, allow a high sampling rate acquisition for vibration recording and is capable of recording frequency spectrums and polar plots. Use of a dual frequency heat run test minimizes erroneous vibration compared to a motor coupled to a dynamometer.

Reduction of High Harmonics

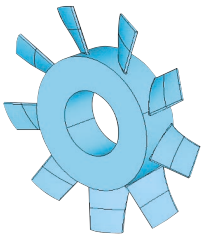
Using the latest engineering simulation tools and modern modal testing equipment made it possible for GE to design a stator which reduced the possibility of operating close to high amplification regions. Flexible or rigid shaft construction may be used based on specific application requirements and design criteria. This is critical when a motor is mounted to a compressor or pump skid.

Stator Construction

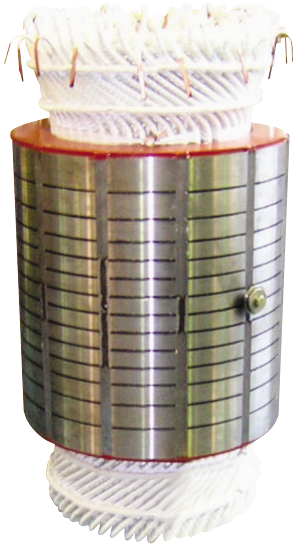
Stator laminations are precision punched from high quality, low loss electrical sheet steel with a thermally stable insulating film. Most ratings are of rectangular frame construction, utilizing packaged cores. The magnetic core consists of laminations compressed for mechanical strength and completely wound before the core package is inserted into the frame. This construction permits free access to the coil end-turns during manufacture and simplifies insertion of the winding and bracing systems. This visual accessibility also helps to ensure increased quality in manufacturing.



Redesigned stator frames using powerful engineering tools such as FEA, which significantly reduce overall vibration levels.



Improved ventilation and cooling has been achieved with a new internal fan design. This allows the Pegasus MHV motor to match internal air flow requirements.



The stator assembly was configured for increased air flow which improved heat transfer and led to a more compact design.

Insulation System

More than 30 years of successful field experience proves the reliability of the insulation system used for Pegasus MHV machines. In addition to providing the necessary electrical insulation, this system meets all the stringent mechanical and thermal requirements found in modern applications. Pegasus MHV products use an epoxy solventless resin vacuum-pressure-impregnation (VPI) process to unite superior insulation materials into a complete insulation system assuring long life. For line voltages of 5000 Volts and above, a semi-conducting armour is applied to the slot portion and graded beyond the core to provide corona protection. The binding agent used in this case is GE's third generation epoxy resin, selected and tested to IEEE-429 and IEEE-1043. The coils receive a protective armor of heavy glass tape for protection against mechanical shock and abrasion. A mylarless system is available up to 4kV.

GE's Custom Polyseal® insulation system is also available upon request. Custom Polyseal® is a sealed winding insulation system which meets NEMA MG1 1.27.2 and passes the test criteria for 12.62 and 20.18. It is designed to meet severe operation conditions and have resistance to moisture penetration, oil, chemicals and salt water.

Rotor Construction

The "squirrel cage" induction motor is a rugged yet simple combination of shaft, magnetic circuit and electric winding. The magnetic circuit consists of punched thin steel discs assembled to form a laminated magnetic core mounted on the shaft. The laminations are coated with a temperature stable insulating film to reduce magnetic losses yet maintain dimensional stability in the face of severe thermal and mechanical stresses. The rotor winding consists of a number of uninsulated metal bars in the outer surface of the magnetic core parallel to the shaft and short circuited by metal rings at both ends.

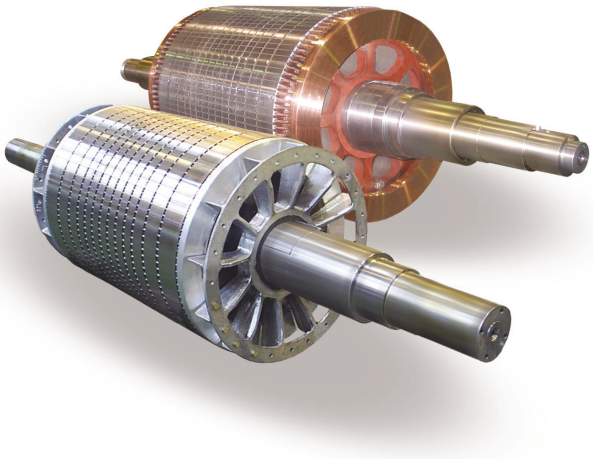
Standard Rotor Features:

- Aluminum bar rotor is standard.
- Copper bar rotor is available to meet API 541 4th Edition and is standard on 2-pole 8213 frame and larger motors.
- A 2 pole machine includes a 5 plane "step" balancing standard - when flexible shaft is utilized, this assures best vibration for increased performance and life.
- 4140 shaft steel material on 2 pole machines. Other speeds may use 1045 shaft steel.

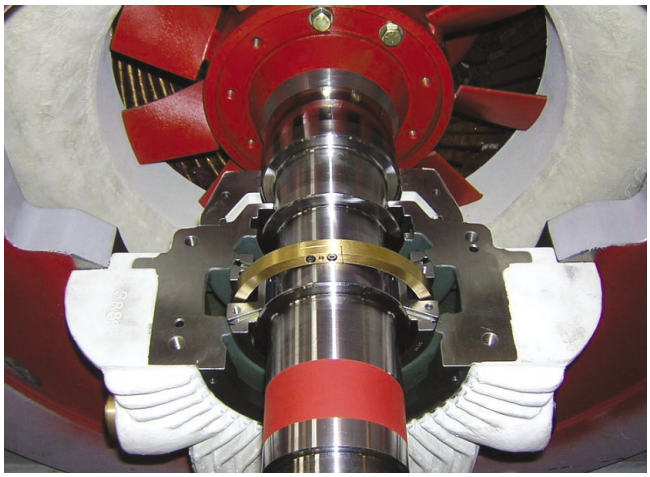
Bearings

Self-aligning spherical seat sleeve bearings per DIN 31693. These bearings employ construction features and sealing systems designed to keep the oil in and the dirt out. Seal additions are also available to meet IP-55 requirements (dust and water jet proof).

- The babbit-lined bearing shell is supported by a rugged housing and employs an oil ring that carries the oil from the reservoir up to the bearing.
- Flood lube systems are employed on 2-pole designs above 2750 HP. The bearings are insulated to eliminate damaging shaft currents.
- Sight holes and split construction allow easy inspection and replacement, without uncoupling the drive load.
- Antifriction bearings are available for smaller ratings.

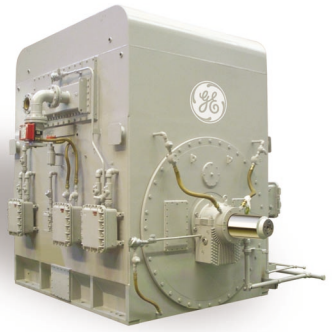


Fabricated aluminum rotor construction is typically included. Copper bar rotor construction is available to meet API 541 4th Edition.



The endshield and internal ventilation circuit was modified to improve air circulation. This translates to a cooler operating bearing.

Expansive Product Offering



Weather Protected Type I (WPI) - IP23

A weather protected Type I machine is an open machine with its ventilating passages so constructed as to minimize the entrance of rain, snow, and airborne particles to the electric parts, and having its ventilation openings so constructed as to prevent the passage of a cylindrical rod 0.75"/19mm in diameter.

Weather Protected Type II (WPII) - IP24W and IP44W

This enclosure is designed for use outdoors in adverse conditions and can be modified to include filters for extreme environments with excessive airborne particles. Air passage includes several abrupt 90 degree changes in direction plus an intake area or reduced velocity to allow solid particles or moisture to drop out before the ventilating air contacts active parts of the motor.

Totally Enclosed Air-to-Air Cooled (TEAAC) - IP54 or IP55

TEAAC provides isolation of critical motor components from the surroundings. The construction of this enclosure utilizes a top mounted air-to-air heat exchanger. External air is drawn in by a shaft mounted fan enclosed in a housing on the opposite drive end or blower mounted fan for larger frames. The air is forced through the cooling tubes at high velocity to promote efficient cooling and cleaning the tubes. Cooling is accomplished by circulating the internal air over the heat exchanger tubes where the heat is dissipated and the cool air is returned to the active parts of the machine.

Totally Enclosed Water-to-Air Cooled (TEWAC) - IP54 or IP55

TEWAC enclosure provides isolation of critical motor components from the surroundings. Consequently, it can be used indoors or out in clean or dirty environments. It is provided with a water-cooled heat exchanger mounted in top portion of the motor for cooling the recirculated ventilating air. Motor heat is conducted away by circulating water and not by discharged hot air, this it is suitable for confined areas. It is also the quietest of all available enclosures.

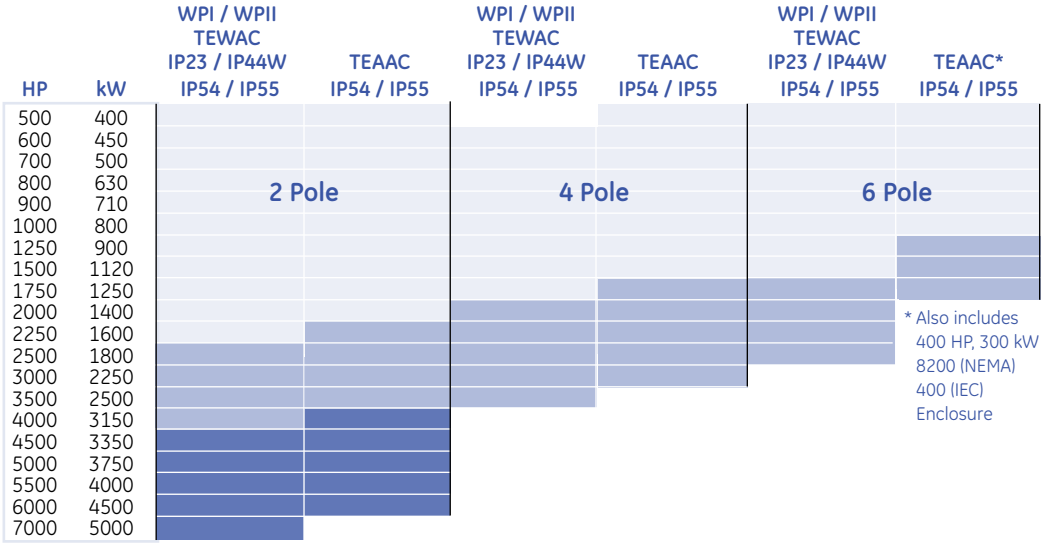
Enclosure Ratings

These ratings are based upon 4000V. Other voltages are available up to 13.2 kV. Contact your GE representative for more information.

8200 (NEMA) 400 (IEC)

8300 (NEMA) 450 (IEC)

8400 (NEMA) 500 (IEC)



Stator

Type	Description	Installation	Qty. Motor	Function
RTD	Resistance temperature detector. The following options are available: Copper; 10 ohms @ 25°C Platinum: 100 ohms @ 0°C Nickel: 120 ohms @ 0°C	Inside Stator	6	May be connected to a monitor, alarm, or shut-off device.
Thermostat	Bi-metallic sensor type Klixon (normally open or normally closed)	Surface of end-turns	1-3	Supplies a signal when a preset, non-adjustable temperature is reached, for alarm or shut-off.
Thermistor (PTC)	Positive temperature coefficient thermistor connected to a solid state relay	Inside Stator Coil Slot	6 Two per phase	Together with the solid state relay, supplies a signal when a preset, non-adjustable temperature is reached, for alarm or shut-off.

Bearings

Type	Description	Installation	Qty. Motor	Function
RTD	Resistance temperature detector. The following options are available: Copper; 10 ohms @ 25°C Platinum: 100 ohms @ 0°C Nickel: 120 ohms @ 0°C	In bearing housing	2 front and rear	May be connected to a monitor, alarm, or shut-off device.
Thermometer	Bi-metallic or capillary tube type	In bearing housing	2 front and rear	Supplies local or remote indication of temperature.
Thermocouple	Element generating a voltage proportional to temperature	In bearing housing	2 front and rear	May be connected to a monitor, alarm, or shut-off device.

Vibration Equipment

Seismic-type such as Robertshaw™ measures overall vibration. 1-6 units are located on the frame.
Proximity-type such as Bentley Nevada™ measures the shaft vibration. 2-5 units are located on the bearing housing.
Acceleration-type such as Metrix™ measures bearing housing vibration. 1-6 units are located on the bearing housing.

Other Accessories

Whenever required, the following accessories may be supplied:

- Surge protection (capacitors and lightning arresters)
- Current transformers
- Pressure switch
- Space Heater
- Tachometers
- Overspeed switches
- Slide rails
- Sole-plates

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