



ELECTRICAL MOTORS

Catering to Core Sectors of the Economy

Making in India | Making for the World

About BHEL

Since 1964, BHEL has been 'Making in India' as a leading Capital Goods sector company. Today, the company's businesses are in the areas of power and industry, offering comprehensive solutions, including products, systems and services to power generation (thermal, hydro, gas, nuclear and solar PV), transmission, transportation, defence, aerospace, oil & gas and other core sectors of the country, and also abroad. BHEL, incorporated as a Public Sector Undertaking of the Government of India with a shareholding of 63.17%, has established 16 manufacturing plants spread across India, producing capital goods for the customers in domestic as well as international markets. The

Company has steadily expanded its product portfolio through both partnerships with global OEMs as well as in-house product development. The in-house product development is backed by consistent investment of more than 2.5% of revenue on R&D and innovation. At BHEL, we firmly believe that serving our customers, protecting the environment, and contributing to society are intrinsically linked, and form the core of our corporate ethos. The Company has been supporting communities through programs like skill development; promoting health, hygiene & education; and running several programs on environmental protection & improvement.



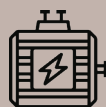
Wide angle view of BHEL Bhopal Golden Jubilee Block

Electrical Machines Group

One of the leading electrical machine manufacturers and having a dominant presence in the Indian market, BHEL's Electrical Machines Group has designed and supplied over 34,000 HT AC machines for various applications in the Indian and overseas markets during the last five decades. The applications include Power Plants, Nuclear energy, Defence, Transportation, Petrochemicals, Fertilizers, Refineries, Cement, Steel Industries, Lift Irrigation Projects, Pipelines, Motors for Strategic Applications etc. BHEL offers Electrical Motors/Generators with high efficiency, exceptional reliability, easy installation and minimal maintenance costs.

BHEL AC machines are designed and manufactured in accordance with the latest technology available globally with state-of-the-art automated production methods and technology, ensuring highest level of consistent quality.

The motors are offered in both standard as well as customized designs to meet the specific requirements of the client. High performance is achieved through optimum utilization of the active materials and components



Product Profile

Equipment	Range
Safe Area Motors	
Squirrel Cage Induction Motors	150kW - 22000 KW
Slip Ring Induction Motors	150kW - 10000 KW
Variable Speed Induction Motors	150 kW to 20,000 kW
Variable Speed Synchronous Motors	1,000 kW to 15,000 kW
Alternators:	1,000 kVA to 30,000 kVA
Hazardous Area Motors	
Flame Proof (Ex'd') Squirrel Cage Induction Motors	150 kW to 1800 kW
Increased Safety (Ex 'eb') Squirrel Cage Induction Motors	150 kW to 6000 kW
Non-sparking (Ex 'ec') Squirrel cage Induction Motors	150 kW to 22,000 kW
Pressurized (Ex 'p') Squirrel Cage Induction Motors	150 kW to 22,000 kW
Pressurised (Ex 'p') Synchronous Machines	1,000 kVA to 25,000 kVA
Special Design Motors	
Permanent Magnet AC Motors & Generators - For Strategic Applications	
Radiation resistant Motors for Nuclear applications	

Manufacturing Range

Voltage Rating	415 V to 13.8 kV
Frequency	50 Hz/ 60 Hz
Pole	2 to 36
Starting Method	DOL/ VFD/ Soft Starter/ LRS/ GRR
Enclosures	TETV/ TEFC/ CACA/ CACW/ SPDP
Mounting	Horizontal (B3, B35)/ Vertical (V10)
Insulation System	Class F/ H
Standard	IEC 60034/ IEC 60079

Strengths - Design

- Strong design team with qualified and experienced engineers
- High-performance design using latest CAD, Modelling, Analysis and Automation Software
- Dedicated department for IT initiatives and Software Development
- Well-equipped NABL (National Accreditation Board for Testing and Calibration Laboratories - a govt. department) accredited labs for material testing and equipment calibration
- State-of-the-art Insulation Testing Lab
- Strong R&D support for development and technical issues
- Active participation in IPR initiatives with good assets of patents/ copyrights
- Centralised library stacking with latest standards, research papers and technical literature
- Agreement with IEEE for sharing of research papers



4 MW Alternator



7-axis Auto Taping Machine

Strengths - Manufacturing

- Fully vertical integrated manufacturing capacity converting raw material to finished product
- Latest CNC machines for various machining operations like grinding, drilling, turning, milling, etc.
- Well-equipped assembly and test plants
- In-house facilities for design and manufacturing of tools and fixtures
- World-class manufacturing facilities for punching, coils and fabricated items using state-of-the-art machines
- In-house foundry for casting components
- High-capacity EOT cranes and clean storage area for material
- Well-qualified team of welders, brazers, fitters, electricians and other technicians



Insulation System & Coil Manufacturing Facilities

- Insulation Taping of Machine Coils
- 7-axis Auto Taping Machine
- Coil Pulling Machine
- Loop Winding Machine
- VPI Plant
- Impulse Test Facility
- AC Storage for Insulation Items



Electrical Machine Manufacturing Facilities

- CNC Lathe
- CNC Vertical Borer
- Vertical Plate Bending Machine
- CNC Jig Boring Machine



CNC Lathe



Turn mill centre



CNC Grinding Machine

Notching & Tooling Shop Facility

- 8 Ton 6 Station CNC Auto Notch Press
- 8 Ton 8 Station CNC Auto Notch Press



8 Ton 6 Station CNC Auto Notch Press

Major Products

- 21.8MW/ 11kV/ 4P horizontal cage asynchronous motor for Boiler feed pump for 800 MW Super critical power plant
- 14.45 MW/ 11 kV/ 8P horizontal cage asynchronous motor for combined ID fan for 800 MW Super critical power plant
- 4.8MW/ 11kV/ 22pole vertical cage asynchronous motor for CW Pump for 800MW Super critical power plant
- 12MW/ 11kV/ 12P vertical synchronous motor for lift irrigation projects



5.2 MW , 11KV, 372 RPM Vertical Syn Motor for Lift Irrigation Scheme



3.3MW/ 11kV/ 36P vertical cage asynchronous motor



4 MW/ 11 kV/ 16P Vertical CWP Motor

- 3.3MW/ 11kV/ 36P vertical cage asynchronous motor for lift irrigation projects for pump thrust upto 140T
- 4.7 MW/ 11 kV/ 20 P vertical synchronous motor for CWP application
- 25MVA/ 11 kV/ 4P horizontal synchronous generator for captive power plants
- End-shield mounted generators for diesel engines up to 10 MW
- 4 MW/ 11 kV/ 16P Vertical Cooling Water Pump Motor (CWP) for Thermal Power Plant
- Complete series certification of Flameproof motors by CCOE & BIS upto 1800 kW SCIM
- TEFC (IC411) motors up to 560 mm centre height in safe area , Ex'eb' & Ex'ec' applications
- Low voltage Permanent Magnet Motors and High Frequency Converters



6MW/ 11kV/ 10P CACW ID FAN motor



5.8MW/ 6.6 kV/ 4P CACA ExP motor

Certifications

- Complete Flameproof motor series are BIS & CCOE, India certified as per IEC 60079-0 & 1
- CCOE (PESO) / ATEX / IECEx certifications for hazardous area motors
- Stator and Rotor gas tests certified as per IEC 60079-7
- Radiation compliant insulation system for Nuclear application

Vertical borer and milling machine at BHEL works in Bhopal, Madhya Pradesh, India



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