

PUTTING INDIA ON THE DEVELOPMENT TRACK

TRANSPORTATION BUSINESS

PROVIDING TRACTION TO INDIA'S PROGRESS



Established in 1964, Bharat Heavy Electricals Limited is an integrated power plant equipment manufacturer and one of the largest engineering and manufacturing companies of its kind in India. The company is engaged in the design, engineering, manufacture, construction, testing, commissioning and servicing of a wide range of products, services and systems for core sectors of the economy viz. Power Generation, Transmission, Industry, Transportation, Renewable Energy, Oil & Gas, Water, Defence & Aerospace, and e-Mobility & Energy Storage Solutions.

BHEL's mammoth size of operations is evident from its widespread network of 17 manufacturing units, 2 repair units, 4 regional offices, 8 service centres, 1 subsidiary, 3 overseas offices, 5 joint ventures, 15 regional marketing centres and more than 150 project sites across India and abroad. BHEL has references in 82 countries in all the inhabited continents, with a global installed capacity of over 180 GW.

In transportation sector, BHEL manufactures a wide range of traction propulsion equipment at its Bhopal, Jhansi and Bengaluru plants. We offer system design, manufacturing, supervision of commissioning and countrywide after sales support for the entire range of propulsion equipment required for Diesel Electric Locomotives, Electric Locomotives, ACEMUs, DEMUs, etc. At our Jhansi plant, we also manufacture complete Electric Locomotives for Railways and Diesel Electric Shunting Locomotives for industrial customers.

With a view to cope with technological advancements and continuous improvements of equipment and transportation systems, BHEL has set up a Centre for Electric Transportation at its Bhopal plant and a Centre of Excellence for transportation at Bengaluru plant. The centres are envisaged to act as the focal point for systems-oriented research in the area of Railway Transportation. These centres have facilities for vehicle testing and computer simulation of service operation.

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TRANSPORTATION SYSTEMS

- Electric Locomotives
- ACEMU Rakes
- Urban Transportation Systems
- IGBT-based Propulsion Systems for Locomotives & EMUs
- Diesel-Electric Shunting Locomotives (Up to 3000 HP)
- Battery Powered Locomotive
- OHE recording-cum-test car
- Battery Powered Road Vehicles
- Dynamic Track Stabilizers
- Rail cum Road vehicle
- Diesel Electric Tower Car **(DETC)**
- Utility Vehicle
- Specialised Wagon (Up to 28 Axle, 296 Tonne)

KEY OFFERINGS



TRACTION EQUIPMENT

- Traction Converter
- Auxiliary Converter
- Vehicle Control Electronics
- Hotel Load Converter
- Traction Transformer
- AC Traction Motor
- DC Traction Motor
- Traction Alternator /Generator
- Motor Generator set for auxiliary requirements
- Auxiliary generator and Exciter
- Traction Gear and Pinion
- Rectifiers & Control Gear equipment for Rolling Stock
- Bogie Frames
- Wheel & Axle Assembly



INSPIRING INNOVATION



WAG7 5000 HP Electric Locomotive

Various variants of BHEL manufactured 25 kV AC Electric Locomotives and 25 kV AC /1500 V DC Dual Voltage Electric Locomotives are in freight and passenger service with Indian Railways.

Air-Conditioned ACEMU

India's first fully air-conditioned AC EMU Rake of 12 coaches with vestibule design is equipped with BHEL developed IGBT based propulsion system.

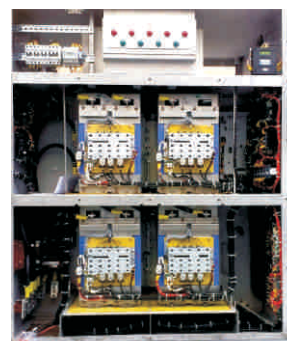


1400 HP Diesel Electric Shunting Loco with Air-conditioned cab

BHEL manufactures Diesel Electric Shunting Locomotives in power range of 350-1400 HP for industrial applications such as Power, Steel, Cement, Fertiliser, etc. that are suitable for multiple unit operation.

Hotel Load Converter

BHEL has indigenously developed Hotel Load Converter for WAP5/WAP7 Electric Locomotives for CLW, Chittaranjan.



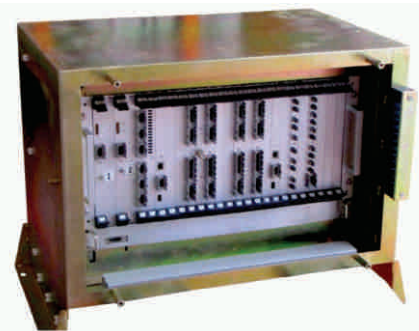


IM4507 Traction Motor

IM4507 is indigenously developed three phase asynchronous traction motor for variable voltage variable frequency applications for 4000/4500 HP Diesel Electric Locomotive.

TCN based Vehicle Control Unit

BHEL was first to develop Train Communication Network (TCN) based Vehicle Control Unit for 6000 HP Electric Locomotives for CLW.

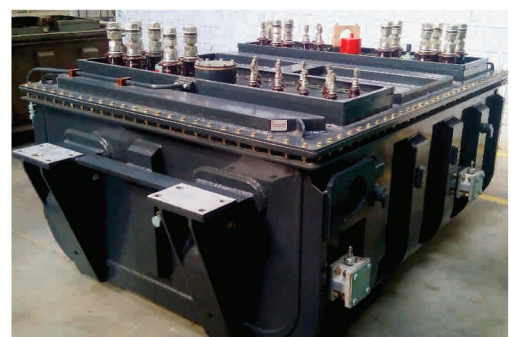


TA9901AZ Traction Alternator

TA 9901 Traction Alternator is 2860 kW AC synchronous machine developed by BHEL for application in 4000/4500 HP Diesel Electric Locomotives for DLW.

7775 kVA Traction Transformer

7775 kVA transformer has been indigenously developed with additional capacity for hotel load application for WAP5/WAP7 locomotives.



PREPARING FOR GROWTH

BHEL has been adept at transforming itself in line with the market requirements throughout its illustrious journey.

Electric Mobility: BHEL is gearing up for electric vehicles market through in-house development of propulsion equipment and charging infrastructure in line with the Government of India's FAME (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles) Scheme.

Indigenous development: IGBT-based AC-traction control system for 4500 HP Diesel Electric Dual-cab Locomotive is being developed in-house. The 645 kW force-cooled IM4508 traction motor for 5500 HP AC-AC WDG5 Locomotive has been developed at our Bhopal works.

Capacity Planning: BHEL has taken up the manufacturing of 6000 HP Electric Locomotive (type WAG 9H) to cater to the increased requirement of energy efficient locomotives of Indian Railways. Existing facilities are being upgraded for development of propulsion systems for 9000 HP Locomotives, Dual mode Locomotives, High horse power Diesel electric locomotives, DEMUs and MEMUs.

Waterways: In the quest of diversifying and capitalising on new business opportunities, BHEL is exploring adoption of ports and terminals on EPC (with O&M) basis to introduce electric propulsion in vessels and inland ferries.

Urban Transportation: BHEL is augmenting its facilities to cater to the demand for manufacture of High Speed Trains, Stainless steel coaches for urban transportation, EMU train sets and Ultra High speed Maglev systems.





- BHEL's greatest strength lies in its strong business foundation and diverse functions, thereby creating new value by transcending existing frameworks and constantly staying a step ahead in dealing with change.
- BHEL has excellent engineering capabilities to evolve and absorb technologies for long term sustenance and competitiveness of complete systems.
- We have been making in India through our established widespread manufacturing base supported by indigenous vendors providing solution for transportation sector since over five decades.
- BHEL has emerged as a reliable partner through long term association with Indian Railways providing quality execution of projects and continual after sales services.
- We have huge investible resources available for expansion, providing excellent opportunities to international markets for collaboration and outsourcing.



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