

Product note

Frameless induction traction motors



What applications are these motors suitable for?

ABB's frameless induction traction motors are used in long distance and high speed traction applications including electric and diesel-electric passenger and freight locomotives as well as in high speed train (HST) and very high speed train (VHST) applications.

What characterizes this motor type?

This motor type is designed specifically to ensure reliable operation and high torque output. The high power range is necessary to meet the operational requirements of freight and high-speed traction applications. The induction motor topology is a simple and robust design that has been proven to deliver high reliability in numerous traction applications throughout the world.

What characterizes ABB's motor range?

These motors have a high performance-weight ratio. By using a frameless design, it is possible to maximize the amount of active material, thus ensuring a compact design. The squirrel-cage rotor bars and short circuit rings are made of high conductive copper to maximize the efficiency. The motor is designed to work optimally with IGBT-based converters. The mechanical and electrical design processes are closely coordinated to ensure an optimum design, where careful notice has been taken to ensure the compatibility between the motor and the converter. The motors are designed to endure extreme temperatures and polluted environments.

How is the motor customized?

Each motor is designed according to customer specification. ABB's motor concept is fully customizable to meet the varying demands of train manufacturers and train operators regarding e.g. output power, mounting arrangements and cooling duct position. Motors are available in the 600–1,800 kW range covering the needs of most high power traction applications. See reverse page for motor performance charts.

What about service and support?

Support is provided from initial concept to maintenance. ABB's network of service workshops provides global coverage. The service organization has broad experience of electric motors, generators and their applications and can thus provide improved operational availability and life cycle profitability.

Main benefits

- Compact frameless motor
- Reliable and robust motor design
- High torque and power
- Fully customizable design
- Global service network

Motor performance charts for ABB's frameless induction traction motors

The motor's performance is fully customizable depending on the specific application and train line profile. Figures 1 and 2 illustrate typical traction curves and output power ranges for the motors.

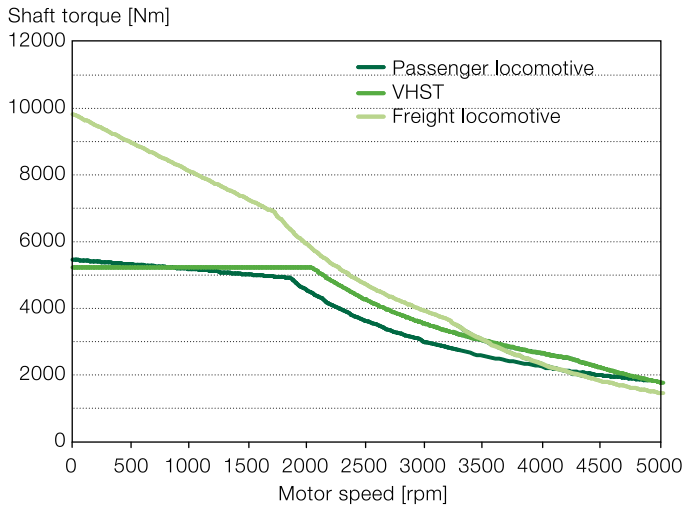


Figure 1. Example of torque versus motor speed curves for ABB's frameless induction traction motors.

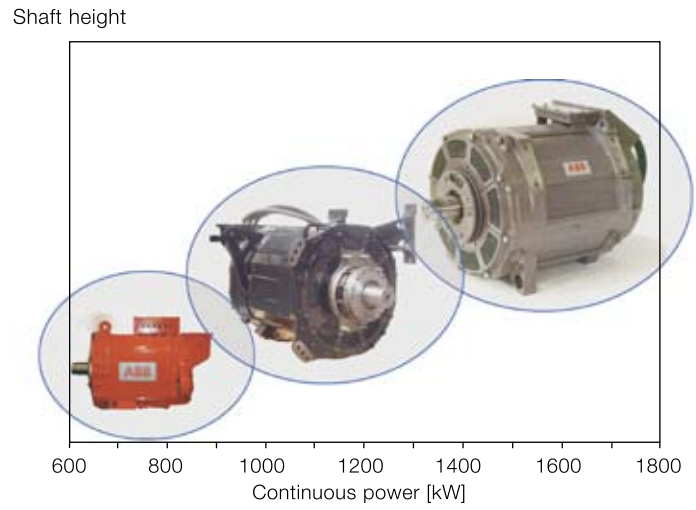


Figure 2. Typical output power ranges for different shaft heights in ABB's frameless induction traction motors.

Technical data

Shaft height	Above 315 mm
Max motor voltage	3 kV _{rms}
Output power range	600–1,800 kW
Speed range	Up to 5,000 rpm
Weight	Up to 2,700 kg
Winding	Form winding, VPI (silicone based resin)
Cooling method	Open forced ventilated
Bearings	Steel or hybrid roller and ball bearings
Sensors	Speed sensor, temperature sensors, bearing sensors
Rotor cage	Copper
Stator/rotor	Low loss electrical steel, optimized slot design for energy efficiency and suppression of harmonic losses
Number of poles	4 or 6
Mounting arrangements	Axle hung (nose suspended), partially suspended, fully suspended

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