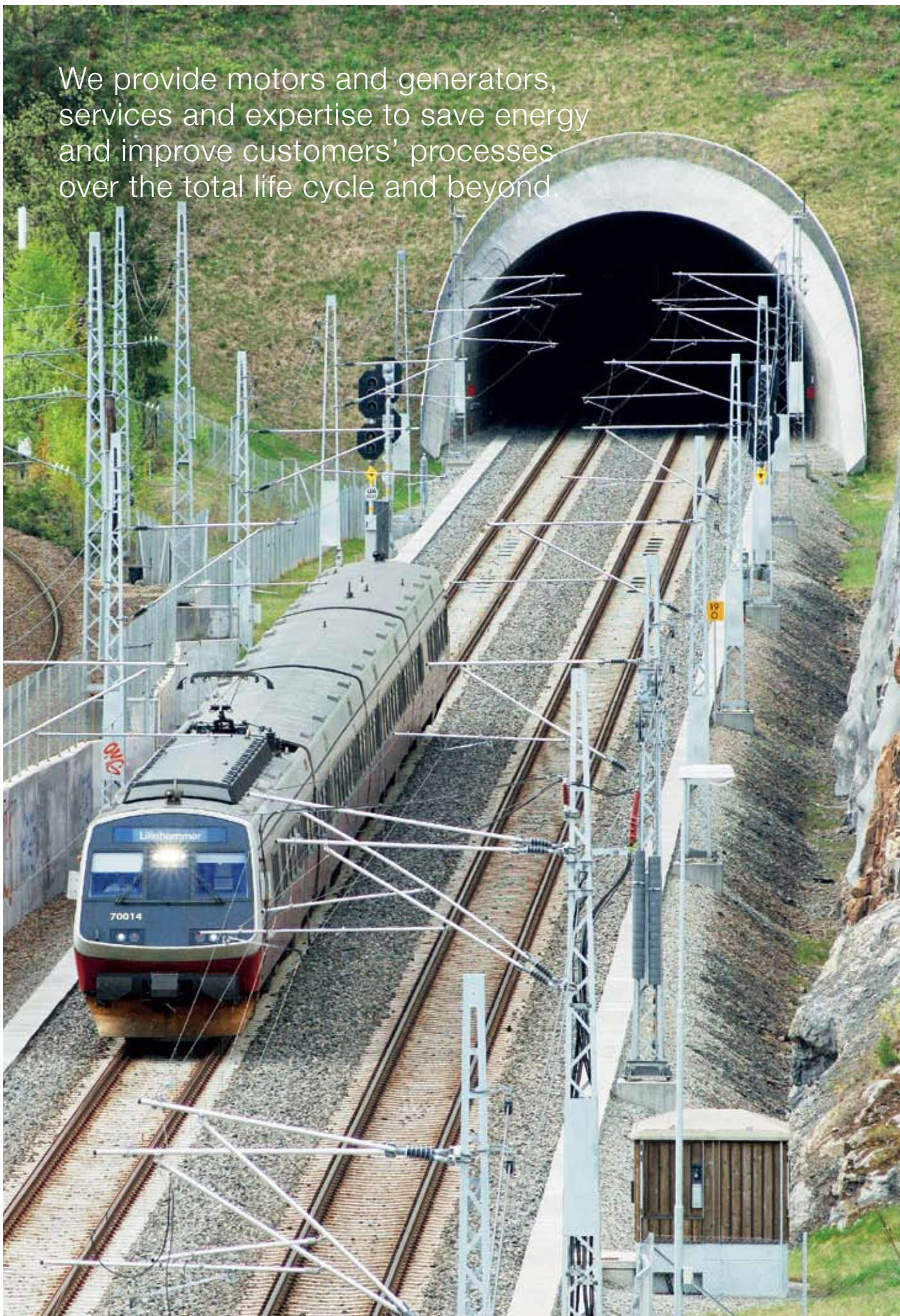




Brochure

# Traction motors – for railway rolling stock

We provide motors and generators,  
services and expertise to save energy  
and improve customers' processes  
over the total life cycle and beyond.



# Latest technology based on long experience

ABB offers a comprehensive range of products and services to the railway industry and strives to be at the forefront of technology in all aspects of its processes and products. The group has a long and consistent record of investment in research and development.

ABB has been delivering traction motors since 1909. These motors include modular traction motors and customized frameless traction motors and are used in installations ranging from light metropolitan tramways to heavy locomotives for intercity expresses.

ABB is an independent traction motor supplier that designs and manufactures its own motors, and manufactures traction motors on a subcontracting basis. Close interaction with traction converter manufacturers and train manufacturers allows ABB to design motors that meet stringent traction requirements.

A solid experience combined with extensive development resources allows ABB to design state-of-the-art units, renowned for their reliability and energy efficiency. Products and manufacturing processes have minimum environmental impact from initial concept to the end of the product life cycle.

Backed by a global organization, ABB reaches customers throughout the world with its traction motors. Thanks to its global manufacturing footprint, ABB is able to locally serve the world's largest and most expansive traction markets.

ABB is committed to supporting its customers and from its long involvement in the railway industry it is very conscious of the needs for safety and reliability in public transport systems. Therefore it provides excellent support and service facilities around the clock, around the world.

# Modular traction motors

## A new era in traction motor design

Traditionally, traction motors are among the many custom made components required by train manufacturers. These motors are intensely engineered, which adversely affect their cost, lead time and ease of maintenance. To overcome these problems, ABB is launching a new modular traction motor concept.

### One platform, multiple designs

ABB is pioneering the traction motor industry by introducing a new generation of traction motors with built-in flexibility so that customer specific requirements can be met by using a single modular concept. The motors can be built according to specification by combining a set of standard components into a vast number of product configurations.

### A wide range of applications

ABB's modular traction motors are available in the low to high power ranges – suitable for use in suburban traction applications such as light rail vehicles (LRVs) and metros, intercity applications such as electric multiple units (EMUs), and high speed trains. ABB is currently working to extend its modular high power range to include frameless traction motors.

### Freedom for new designs and retrofitting

The modular motor allows train manufacturers considerable freedom for both new designs and for retrofitting due to its scalable design. In addition to satisfying a wide variety of customers, the concept makes it possible to streamline production, simplify sourcing of supplies, cut the cost of poor quality (COPQ) and, ultimately, reduce the life cycle cost of the motor.

### Shorter lead times

ABB offers train manufacturers competitive motor solutions that can be procured and delivered considerably faster, while ensuring motor efficiency and reliability by using advanced design tools and standardized components. Train operators benefit from more cost effective maintenance schemes and faster access to spare parts.

### Meeting the demands of the expanding rail industry

The rail industry is expanding and new rail projects are initiated at an accelerating pace. As a consequence, the world market for the rail supply industry is expected to continue to grow over the coming years. ABB's modular traction motors are poised to meet increasing demands for energy efficient electric traction motors in the rail industry.

# Modular traction motors

## Freedom of design for train manufacturers

ABB's modular traction motors can be built to specification by combining a set of modular features based on standard components into a vast number of product configurations. These are some of the modularized features.

### Scalable design

The flexible house design allows for scaling the motor's performance to customer requirement.

### Pre-defined cross sections

Rating according to design requirements ensures high operating efficiency while providing maximum flexibility for the bogie layout.

### Cooling arrangements

The motor can be delivered with different cooling methods: closed self ventilated (CSV), open self ventilated (OSV), open forced ventilated (OFV) or water cooled (WC). Customers can choose to make the air inlets and outlets part of the house or of the shield, on either the drive end side (DE) or the non drive end side (NDE).

### Bracket attachment

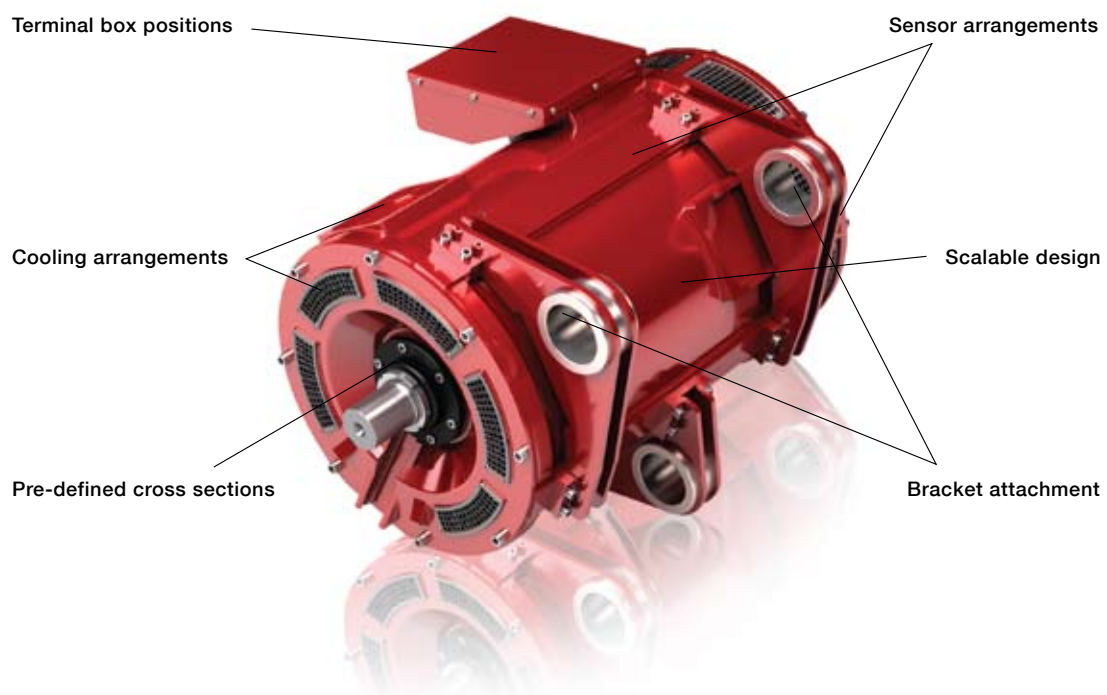
The brackets are adaptable to support a large number of bogies and attachment methods. The brackets are made as separate parts in order to reduce lead time and increase quality, reliability and flexibility.

### Terminal box positions

Customers can choose to place the terminal box in different pre-defined positions on the house. Other positions are also available on request. The design also supports flying leads to an externally mounted terminal box.

### Sensor arrangements

Thermal sensors can be placed optionally e.g. in the winding, stator core or bearings. Speed sensors are integrated to keep the motor compact, while allowing sensors to be replaced without de-assembling the motor from the bogie.



# Modular induction traction motors

## Customized from standard components

ABB's new modular induction traction motor range is an excellent example of how the mechanical structure of the motor can be customized to customer specification. The design of the house and shield is standardized, yet prepared for adaption of a range of features including cooling methods and mounting arrangements.

### Compact and adaptable design

The flexible house design makes it possible to build compact motors with dimensions and performance scaled to customer requirement. The drive and non-drive ends of the motor have not been predefined, allowing full mounting flexibility. The position of the terminal box and air intake and outlet ducts can be adjusted to optimize performance and space constraints.

### Different cooling methods

To meet different operating requirements, the motor can be delivered with different cooling methods: closed self ventilated (CSV), open self ventilated (OSV), open forced ventilated (OFV) or water cooled (WC). An OFV can be converted to an OSV simply by adding an elongation ring, a fan and extending the shaft. Air inlets and outlets can be part of the house or of the shield, on either the drive end side (DE) or the non drive end side (NDE). This provides a standard structure for traction motors with different cooling methods so that service and access to spare parts are simplified.

### Flexible mounting

The motor's mounting brackets can be fitted in a variety of positions. This allows train manufacturers freedom to choose the appropriate method to fit the motor to any bogie. As a result, the motor can be integrated in a small space, offering the freedom to fit or retrofit motors to both new and existing designs. The brackets are made as separate parts in order to reduce lead time and increase quality, reliability and flexibility.

### Robust and enduring

Many parts of the motor have integrated functions to reduce the number of components and to ensure that the motor is compact and robust. The motors are designed to endure extreme temperatures and polluted environments.





# Frameless induction traction motors

## Designed for reliability and high torque output

ABB's frameless induction traction motors are designed specifically to ensure reliable operation and high torque output in electric and diesel-electric passenger, freight and shunting locomotives as well as in high-speed train applications.

### A robust design with a high torque density

ABB's frameless induction traction motor has a robust design that has been extensively proven to deliver high reliability throughout the lifetime of the motor. These are high power motors that meet the operational requirements of freight and high-speed traction applications. The frameless design makes the motors compact with a large amount of active material in relation to its volume. This helps maximize torque output, making the motors suitable for traction applications.

### Fully customizable motors

ABB's motor concept is fully customizable to meet the varying demands requested by train manufacturers regarding e.g. output power, mounting arrangements and air duct position. ABB has the design skills and experience necessary to achieve a carefully calculated optimum solution for each application, whether tailor-made or based on a standard design.

### Advanced design tools

The latest design tools are used at each stage of the design process. These tools include analytical dimensioning tools and FEM analysis tools. Careful checks are made to ensure the compatibility between the motor and converter. Other checks include a torque pulse analysis.

The mechanical design development is closely coordinated with the electrical design to ensure optimum results. It includes detailed stress analysis and calculation of resonance frequencies. These rigorous procedures and earlier well-proven designs allow ABB to supply efficient, reliable, long lasting and high performance motors.





# The ABB advantage

Traction motors are a long-term investment requiring first class products and first class, long-term support. As a global supplier of advanced technical products, ABB provides a truly comprehensive support organization.

## Quality products

ABB is a leading international group and to meet the challenge of supplying top quality products competitively and with short response times, ABB has developed global manufacturing facilities and an independent supplier network. All of these arrangements are subject to stringent quality assurance procedures.

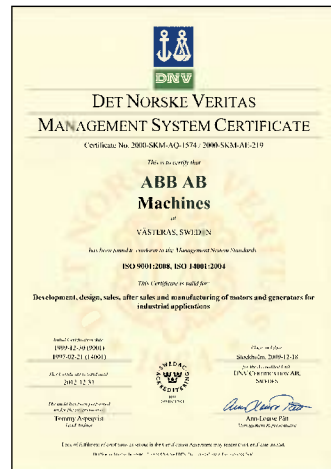


ABB manufacturing units are certified to ISO 9001:2008, ISO 14001:2004 and IRIS.

## Customer support

Railways are long term projects in which good, fast communication is essential. ABB provides customer support from its manufacturing centers and through its local offices. ABB is present in more than 100 countries so that although the support is global it also has the benefits of being local.

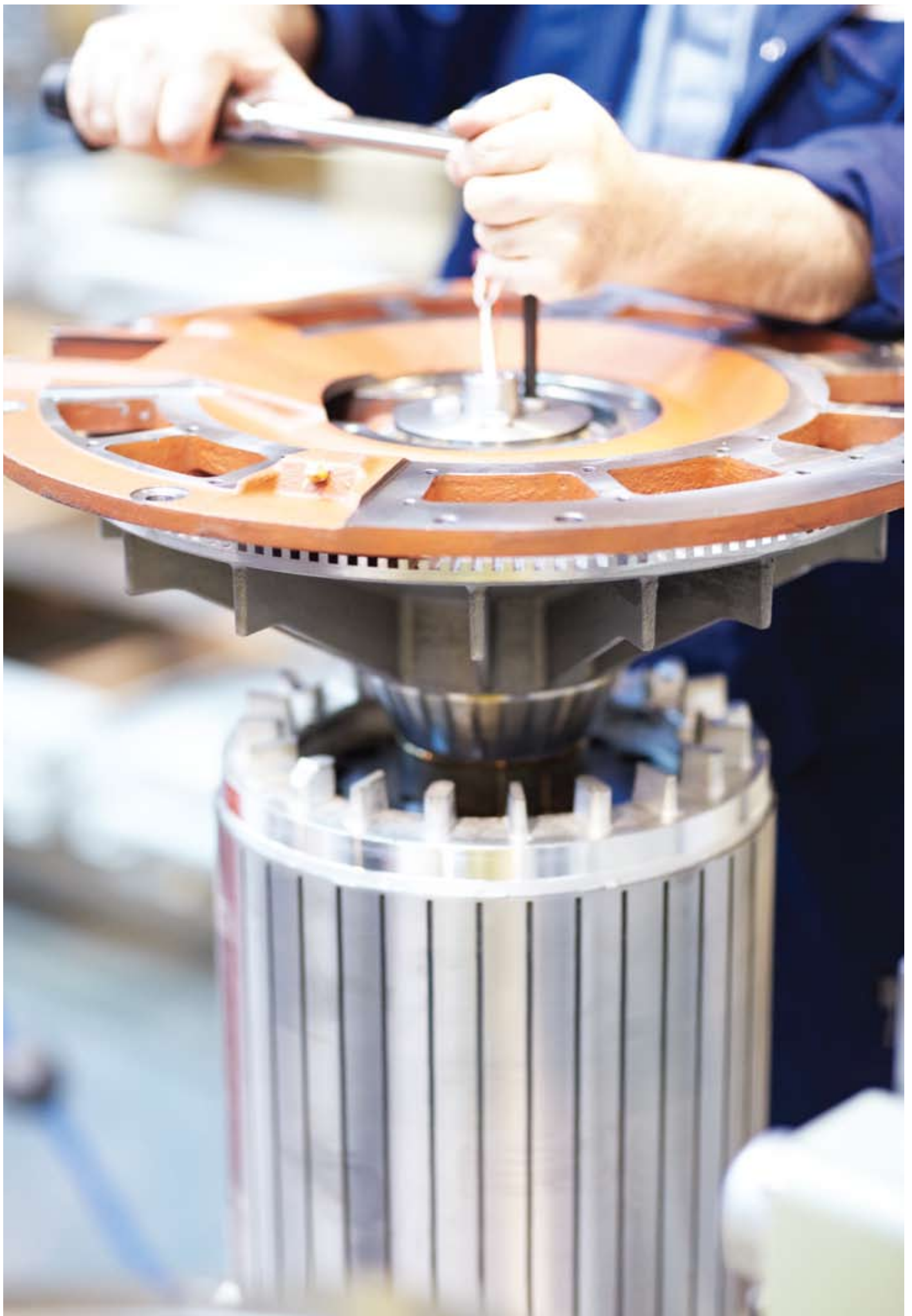
Customer support is provided from the initial concept through to the operation and maintenance stages. An example of customer support is the rating program to assist train manufacturers at the bidding stage. From a schedule of track gradients, distances and journey time ABB can rapidly select the appropriate traction motors. No matter what the requirement, ABB will help you find the best solution.

## Service and maintenance

ABB motors are aimed at trouble-free operation over the entire product life cycle. The motors are designed to allow quick and easy maintenance so that maintenance costs and downtime can be minimized. 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 for customers.

Based on information and experience relating to maintenance schedules and costs, ABB uses life cycle management models to plan effective preventive maintenance procedures. This assists users to reduce total life cycle costs.

It is easy to work with ABB as your partner!



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