

APPLICATION NOTE

ABB traction motors

Electric multiple unit (EMU)



Few or several driven axles? ABB provides traction motors for both EMU design concepts, reflecting train manufacturers' core design values – while also helping customers to optimize their propulsion solution.

There are many aspects to consider when designing an electric multiple unit (EMU). One of the most obvious of them is selecting the number of driven axles in the train. ABB's traction motor portfolio covers any EMU traction system configuration, from only a few to several driven axles.

It's a choice between configuring a few driven axles with few high-power motors, or several driven axles with several low-power motors in order to add up to the specified total torque and power.

With the purpose of providing optimized motor concepts for both main propulsion configurations, ABB has concentrated its technology development on framed motors and high torque density welded stator frame motors, respectively.

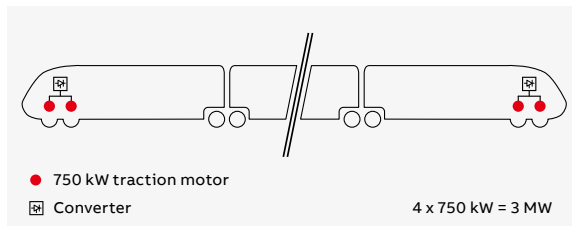
ABB has delivered traction motors to numerous EMU projects over the years. Thanks to our extensive experience of motor design and manufacturing, we are able to consult in any traction motor matter.

Train manufacturers are offered the opportunity to optimize the train's propulsion system according to actual operating requirements – maximizing propulsion efficiency through ABB's proven and innovative motor design concepts.

One size doesn't fit all.

Few or several driven axles?

Every train is unique – and so should its motors be. ABB makes EMU motors based on actual operating conditions. Here we outline some key differentiating factors in traction motor design when configuring EMUs with few and several driven axles, respectively.

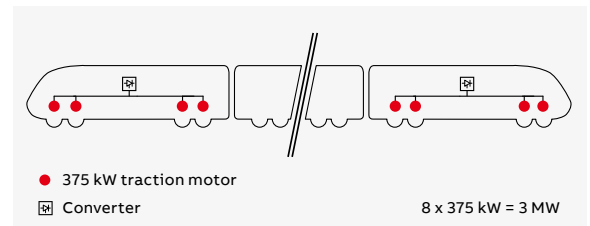


Few driven axles

A main argument for configuring an EMU with few driven axles is to keep the total number of components as low as possible. This is, in turn, attractive from both cost and reliability point of view.

With fewer motors generating the tractive effort, each motor needs to be more powerful. These motors are typically forced cooled from an external fan, an arrangement that requires a high degree of integration into the car body. Each motor must be perfectly tailored and optimized from a system perspective, rather than being mechanically optimized individually.

This propulsion type typically requires traction motors with high torque density. ABB's welded stator frame motor utilizes the given space envelop to the maximum, providing the optimum performance-space ratio for trains with few driven axles.



Several driven axles

Train manufacturers who prefer EMUs with several driven axles can more easily achieve the required acceleration and higher redundancy.

Several driven axles mean more motors – each of which will be smaller in size and power. As a consequence, there is typically more space available for each traction motor. These motors are however as challenging to integrate into the car body as motors designed for fewer driven axles.

For EMUs with distributed power and several driven axles, ABB's framed motor family with its cast housing offers almost endless possibilities to adapt motor fixations. Furthermore, the robust weldless housing structure surrounding the stator dampens electromagnetic noise (EMC).

ABB offers customized traction motors based on pre-defined and proven technology platforms. We select technologies for e.g. rotors, suspension and cooling to cost-effectively tailor motors according to customer specification.



ABB EMU motors

ABB's EMU motor portfolio includes welded stator frame motors that are forced cooled using an external fan for trains with few driven axles, as well as framed motors with weldless (casted) housing suitable for trains with several driven axles.