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A simplified approach to motor drive

ABB said its new MV Titanium concept offers an all-in-one solution that provides simplicity and energy efficiency across a range of applications.

According to the company, the MV Titanium is the world's first medium-voltage (MV), speed controlled, industrial motor in the 1-5 MW range. The MV Titanium motors are intended for use with pumps, compressors, and fans as typical applications, where they could reduce energy consumption by up to 40% as well as enhancing productivity and minimizing downtime. They will be used across a wide range of sectors including power and renewables, processing, mining, cement, and water. In the longer term, the company sees the motors being used in hydrogen applications as well, said Heikki Vepsäläinen, president of ABB Large Motors and Generators.

"It's cost-effective and straightforward to install a suitable matched motor, with increased control, monitoring, and connectivity in a single package," Vepsäläinen said. "It is the right upgrade solution for existing direct-on-line motors. And the potential savings in energy costs and CO₂ emissions are huge – if we retrofitted the entire installed base, it would be like taking just over 1000 coal-fired power stations offline."

Energy Efficiency

Vepsäläinen stressed that the new motor concept's energy efficiency was a key benefit and one of its chief selling points, especially for companies concerned about their carbon footprint.

By 2030, existing technologies will drive most CO₂ emissions reductions, but by 2050, nearly half will stem from innovations yet to come, the company said. This new concept helps achieve

those 2050 targets. The current installed base of medium-voltage direct on-line motors (DOL) is around 1,000,000. ABB said that half of the estimated installations between 2024 and 2027 will still be direct online motors, which gives the company an estimated yearly installation amount of around 35,000.

"What is positive here is that the global electricity demand is growing 10 times faster than any other energy source global gas today," Vepsäläinen said. "So that is already a positive sign solely that many of the things are going to be electrified, which gives us an opportunity to cut the carbon emissions. And that's really where ABB is able to help our customers and also the journey towards Net Zero carbon."

ABB said it developed the MV Titanium concept to address the main perceived obstacles related to installing a drive with a large motor. These include not only the

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IMAGE: ABB

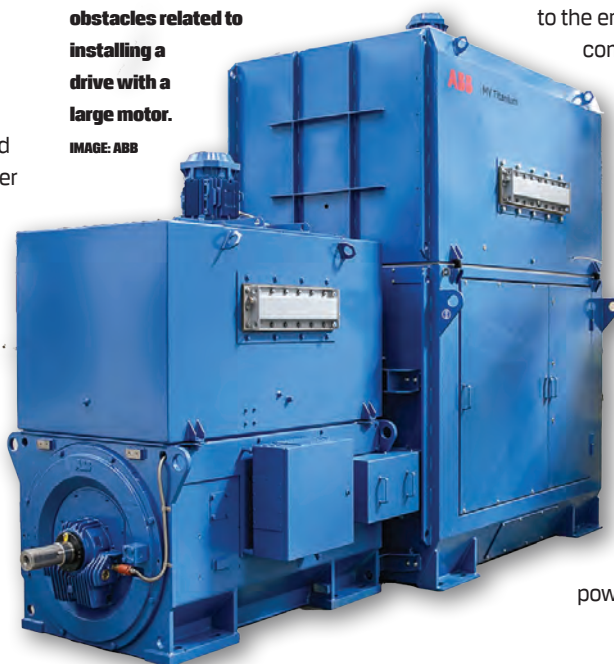


ABB says its new MV Titanium concept offers all-in-one solution.

By Jack Burke

initial cost of a separate drive, but also its associated electrical house (e-house), transformers, switchgear and cabling that multiply the capital cost and increase the complexity of installation, especially on existing sites where space is at a premium.

"Energy efficiency measures of speed-controlled motors have gained significant traction in small size motors, for low voltage applications," Vepsäläinen said. "But large motors have so far been left behind, due to initial cost and complexity, with only 10-15% currently connected to a drive. But that is set to change with our new MV Titanium concept."

Design hallmarks

In addition to those savings, the MV Titanium concept will also provide OPEX savings due to the energy efficiency it will provide, the company said. The next-generation

concept has been built on ABB's 140 years of motor design and 50 years of drives technology experience to create a solution that integrates energy efficiency, controllability, and connectivity into a single package.

Furthermore, it has intelligence built in, with analytical and connectivity capabilities so it can seamlessly integrate into existing systems, as well as providing software libraries and interfaces for process monitoring and optimization.

The whole electromechanical powertrain is designed and delivered

as one package to the customer. The package matches the customer's process requirements and needs at the site.

Instead of designing components separately, the concept is about designing the electro-mechanical powertrain as a whole. It's not just putting the separate parts together and selling that; it is a new way of converting electricity into motion, the company said. The customer can add speed and process control to their existing pumps/fans by replacing existing direct online motors with this new motor.

"This structure was totally rethought, and the obvious point here is that whatever was invented by Tesla 100 years back the basic electromechanical formulas are still valid, but they are used differently," Vepsäläinen said.

ABC said the MV Titanium will bring a payback time of an average of 1-3 years when replacing an existing fixed-speed motor.



"(T)his...concept represents a significant step forward."

HEIKKI VEPSÄLÄINEN, President of ABB Large Motors and Generators.

MV Titanium can be placed next to the process environment without needing to be placed in a separate electrical room. Existing medium-voltage supply cables can be used; there is no need for separate motor cables from the motor to the speed control unit, and neither space nor cooling are needed in the electrical room.

Parametrization and commissioning are completed during the factory test. Every start is a soft start to decrease the mechanical stress of the mechanical drive

train and its components.

"It's not only about the money, it's also about the complexity...what we are bringing into the marketplace is actually the simplicity, it's easy to install, easy to manage, easy to operate," Vepsäläinen said.

Why now?

Separate larger motor and drive systems have been offered for more than 40 years, Vepsäläinen said. But there are challenges associated with these separate systems (cost, efficiency, and the facilities needed). These challenges tend to lead end users to choose direct online motors instead of speed-controlled motors. This new concept will remove most of these barriers.

"Beyond its technical progress, this next-generation motor concept represents a significant step towards productivity in a low carbon world," Vepsäläinen said. "It puts ABB well on the road to support changing large, fixed speed motors to fully electrically controlled motors, one by one."

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