New opportunities for machine builders with high dynamic performance motors

High dynamic performance (HDP) induction motors offer an exceptionally dynamic response and high power density. Their reliability and longevity have made them popular in applications such as plastic and rubber extrusion, injection moulding, winders, lifting, test benches, and machine tools.

Machine building OEMs can now capitalise on a new generation of HDP motors to help them improve their replacement motor offering, while developing new and innovative machine designs. With frame sizes ranging between 80 and 400 – and output capacities of up to 2MW – the new HDP motors are designed for use with a variable speed drive (VSD) in a wide variety of machine types, sizes, and applications. The motor-and-drive packages offer superior machine performance and high energy efficiency, and are suitable for retrofitting or new designs. They're also available in high-speed and water-cooled variants.

A quick step back

To grasp HDP motors better, it's helpful briefly to look at their origin. Industrial machinery relied on DC motors in earlier days because of their superb speed control. However, the introduction of VSDs in the 1980s made it possible to control the speed of the more powerful AC motors, resulting in improved performance and energy efficiency.

Subsequently, specialised AC motors with a square, cross-section frame design gradually started replacing DC motors. These motors possessed market-leading power density – a classic technology advantage because it enables a compact installation footprint.

Another critical technical advantage is the motors' low rotor inertia. They can shift rotational direction faster to speed up back-and-forth machine motion, an essential requirement for smooth and precise machine operation. The square frame design – coupled with a high overload capacity – gives low-inertia motors an excellent dynamic response. It is possible to equip the motors with a mechanical integrated holding brake or several other feedback devices.

Based on simple induction technology, specialised AC motors have proven more economical and service friendly than the previous DC motors. Today, they're the dominant player in the retrofitting and new machine design markets. HDP motor variants that offer OEMs a high-torque option, with superior power density specifically for industrial machine use, are currently in design.

The dual power-density benefit

There are two ways in which machine builders can capitalise on the high power density of HDP motors.

The first is retrofitting an existing machine with a stronger drop-in replacement motor. To make this possible, it's crucial to match the frame size of the current motor with the minimum additional engineering work. The most significant value-added feature of HDP drop-in motors is their exceptional power density. Being more powerful will give machine builders a strong new competitive edge, since they'll boost machine performance.

The second option for OEMs, when designing a new machine type, is to select a motor of a smaller frame size but with the same output. Floor-space constraints make machine compactness an increasingly important differentiator for machine builders and their customers. Depending on the machine's category and type, the motor's compactness can significantly impact the compactness of the machine itself.

OEMs can design more compact machines by selecting a smaller-frame motor with a high power density. Although smaller, HDP motors deliver the same output as previous-generation motors that were bigger.

Added flexibility and customisation

Over and above the variable frame sizes, HDP motors offer an additional design benefit with the high-speed and water-cooled alternatives. Therefore, it's critical for OEMs to select a motor with the scalability and flexibility intrinsically built into its design.

For example, motor manufacturers like ABB can supply OEMs and end users with programmable encoders to help them adapt to their changing needs, without having to keep a set of encoders in stock.

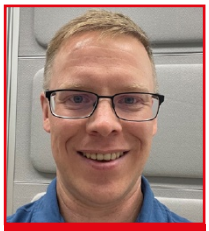
Ease of installation

Installation friendliness is another critical consideration. For example, machine builders can install a replacement HDP motor into an existing machine within minutes without excessive engineering work. Installation simplicity is a visible feature in nearly every design aspect of an HDP motor – from installing accessories such as cooling fans, encoders and brakes, to easily accessible connection points.

For example, ABB's range of HDP induction motors has adjustable key components for the easy mounting of the terminal box, regardless of machine-specific space constraints.

Finally, it's vital that machine builders select motors that comply with the IEC 60034 standard to make them suitable for use across the globe.

For more information on high dynamic performance motors, visit ***https://bit.ly/3MOD1Dv***.



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