New AM3000 motor range expands Beckhoff drive technology

Pole-wound servomotors

The AM3000 range of Synchronous Servomotors offers an alternative to the proven AM2000 series.

The Beckhoff drive technology product range is optimized for PC-based control applications. The Industrial PCs from Beckhoff and TwinCAT PLC/NC/CNC software are ideally equipped for single and multiple axis positioning tasks with high dynamic requirements. The new AM3000 Synchronous Servomotor series expands the motor range with a compact, high-performance variant.

The complete drive technology solution from Beckhoff consists of: AX2000 and AX2500 series Digital Compact Servo Drives, AM2000 Synchronous Servomotors and AL2000 series Linear Servomotors. New winding technology means that the new AM3000 motor series is a real alternative to the proven AM2000 series. For these motors, the stator is not wound outside the housing but inside through a needle winder.

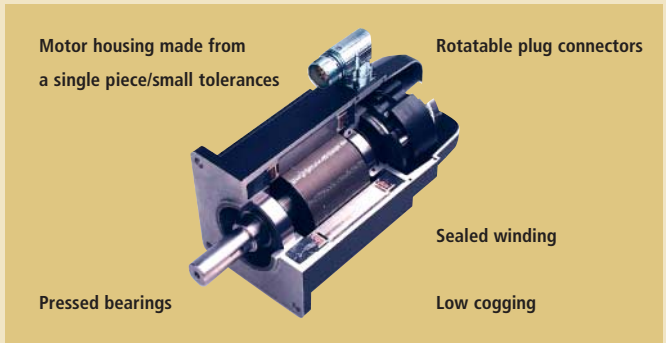
With conventional technology, the winding is pressed into the grooved laminated core. This only achieves a copper filling ratio (which determines the maximum torque) of approx. 40 percent. Also, the insulation layer has to be significantly thicker in order to protect the wire from mechanical stress and to prevent damage.

With pole winding, the copper wire is always in close contact with the iron core. The wire insulation can be much thinner, since no pressing of the winding head is required. These measures lead to a significant increase in the proportion of "active" copper, which determines the torque value, so that the performance yield of the AM3000 series is approx. 25-35 percent higher. An additional benefit is that the motors are significantly shorter than conventional models.

Sealed winding

The AM3000 servomotors are characterized by extremely low moment of inertia of the rotor, robust design and high overload capacity. The winding is sealed in order to eliminate air between individual wires, since the thermal resistance of air is higher than that of epoxy resin. This seal further increases mechanical resilience in case of vibration or other disturbances.

Andreas Golf, product manager for drive technology at Beckhoff, said of the new servomotors, "We have already implemented the first projects with the new AM3000 type servomotors and the feedback from customers is very positive. Performance and power density are significantly higher than comparable motors. We've already had to significantly increase stock for the AM3000 motors."



Single-piece motor housing

Servomotors dissipate a large proportion of the heat generated inside the motor via the flange. It is, therefore, important to keep the heat transfer resistance as low as possible. For this reason, the housings of the AM3000 motor series are made from a single piece, since material transitions increase the thermal resistance and have a negative influence on the stability of the motor.

The AM3000 Synchronous Servomotors are available with seven different flange sizes and for each size a wide range of variants is available. This means that once the flange size has been defined, there is scope for variation in the length. The motors are offered with torques between 0.18 and 53 Nm and with a wide range of nominal speeds so that for each application and gear ratio, the motor with the optimum dimensions can be selected.

Properties

- Rotatable plug connectors for power and feedback are freely rotatable, making wiring of the whole machine easier.
- Pressed bearings prevent axial motion of the shaft.
- Tight tolerances result in a highly symmetric structure inside the motor reducing cogging to an absolute minimum.
- Feedback option (similar to the AM2000 series) – resolver, single-turn and multi-turn absolute encoder.
- The motors are optionally available with smooth shaft or with groove and feather key.