TwinCAT Cogging Compensation for AL8000 linear motors

Machine learning solution compensates for cogging forces in high-precision linear motion

The highly dynamic AL8000 linear servomotors from Beckhoff now meet even higher requirements for accuracy and synchronization with the new TwinCAT Cogging Compensation software (Engineering TE5920, Runtime TF5920). This makes the linear motors particularly suitable for high-precision applications such as milling machines or laser cutting machines. The cogging compensation software makes use of machine learning, which is seamlessly integrated into TwinCAT and applied on a fully automated basis.

Cogging forces in linear motors are caused by the magnetic attraction between the iron core in the primary part and the permanent magnets in the secondary part. This physical effect leads to an unwanted and uneven ”cogging” of the motor, meaning that applications with extremely high accuracy and synchronization requirements can only be executed to a limited extent. This is where the AL8000 linear motors in combination with the TwinCAT Cogging Compensation software offer an optimal solution: the cogging forces are reliably compensated with the help of this software, which takes not only magnetic effects into account, but also those of the mechanical design or energy chains. As a result, the range of possible applications for the AL8000 iron-core linear motors is significantly expanded.

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Cogging compensation is based on the fully automated application of machine learning in TwinCAT. The software independently records the necessary cogging data in the respective customer application as part of a reference run over the entire length of the linear motor's magnetic track. With the help of the data acquired in this way, the software trains a neural network, which is ultimately integrated into the control system for current pre-control. By adapting the current pre-control in this way, the lag error can be reduced by up to factor 7 and the synchronization of the machine increased by up to factor 5 without any hardware changes to the AL8000.

➔ **www.beckhoff.com/te5920**

Press picture:

Picture caption:
With TwinCAT Cogging Compensation, AL8000 linear motors also benefit from modern machine learning methods.

Press kit:
www.beckhoff.com/media/downloads/press/pr052022_beckhoff.zip

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