Abstract

Stepper motors are powerful and efficient. They are manufactured within a torque range from 0.01 Nm up to 100 Nm. The most popular range is 1 Nm. Approximate 600'000 stepper drivers are sold in Switzerland every year. They are build in production facilities and equipped with simple drivers, using special IC's from dedicated manufacturers.
In order to increase operational safety, the motors are normally driven with 80 to 100 % of their nominal current. Current reduction possibilities often will not be taken into consideration.

The energy saving stepper drive is controlled this way, that current flows only if the motor really needs the torque.

With standard servo components of „*LEAG* Antriebstechnik AG" the speed of 1'300 RPM were reached. A new commutation electronic had to be developed, using a 75 MHz RISC microprocessor and an optimized current control, to reach the requested 3'000 RPM.

The power consumption measurements between the novel drive unit "New Stepper" and a conventional stepper amplifier showed a 50 % input energy reduction.

Due to these positive results, a second project should be launched to test the controller within field conditions and to convince stepper motor users about the advantages of the novel solution.

The advantages are:

- To halve the energy consumption
- To increase the operational safety
- To increase the motor dynamic
- To double the thermal reserve of the drive, or to reduce equipment costs.

The amortization of the additional costs, due to the energy saving of 100 W installed power, is possible within 8 to 12 month.

energieschweiz

LEAG Antriebstechnik AG

Grubenstrasse 92, 8200 Schaffhausen