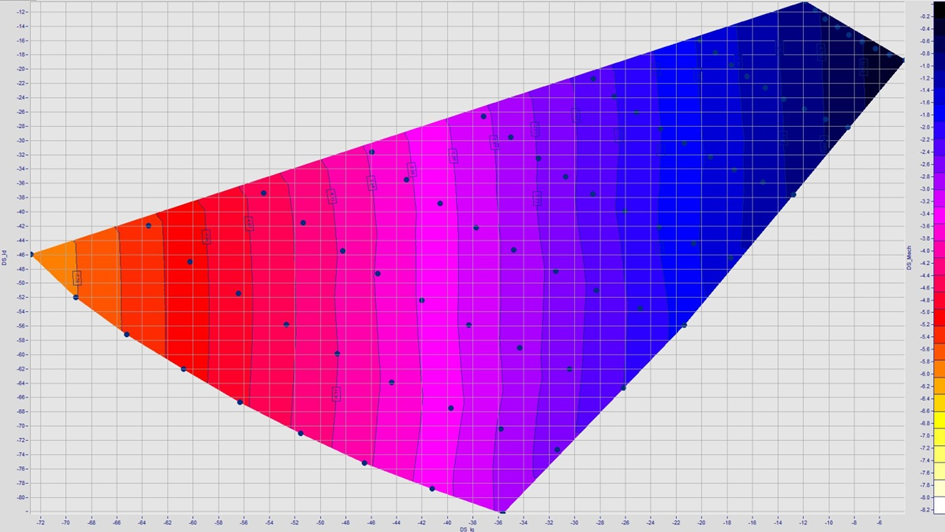
**imc offers magnetic flux evaluating to support**

**EC motor developers for ECU design**

Berlin, 01 August 2016 – The test and measurement specialists at imc Meßsysteme GmbH have developed a new “flux table” test method that will greatly support EC and BLDC motor developers in their efforts to precisely tune ECU design for their motors. Up to now, characteristic maps of flux distributions have predominantly been determined by simulation. Thus, the accuracy of the results depends on the complexity of the underlying motor modelling that is used. In contrast, imc determines the flux tables metrologically. The calculations are thus based on real motor characteristics, yielding very accurate results.

Effective immediately, imc is offering this test method for commissioned testing. In addition, this method is available as an option on all new, and even pre-existing, imc e-motor test stands, which are based on imc STUDIO measurement software.

During testing on the test stand, the DUT is mechanically coupled with the load machine. The load machine forces a constant RPM to set the desired operating points of the DUT. A power converter serves to control and feed the respective currents id and iq into the DUT for these required operating points.

When fine tuning the power converter ECU to a specific motor type, it is necessary to determine the distribution of effective magnetic flux components in q and d, as well as the associated power, generated torques and the resulting voltage. The aforementioned parameters are recorded and evaluated at different RPM points with corresponding variations in current. The flux tables can be provided both as a function of id and iq or as a function of the total current and the rotor displacement angle. In addition, an analytical (non-linear) relationship between the currents and fluxes is given. The characteristic curve of the maximum achievable torque at a given current and voltage limit is created and presented in a table.

If the testing is carried out at imc on one of their in-house test stands, the customer will receive a detailed report of the results with diagrams and flux tables in Excel format. Measurements of power, torque, id and iq current and the magnetic flux in the d and q axes are listed in a table versus the RPM values.

By having the complete implementation of the test in imc STUDIO and analysis carried out by imc FAMOS, e-motor developers that operate existing test stands from imc can easily upgrade their investment. By simply integrating the new test procedure into the test stand control, the functionality can be expanded. The test is fully automated and provides a comprehensive report in PDF format, as well as flux tables in Excel upon completion.

Example evaluations are available from imc for interested customers.

Additional information:  
<http://www.imc-berlin.com/electric-motor-testing/>

Background

In the automotive industry, EC and BLDC motors are becoming increasingly more important due to their reduced wear and high efficiency. Instead of using traditional brushes that are susceptible to abrasion, EC motors use electronic sensors for detecting the rotor position relative to the stator coils. A dedicated electronic control unit (ECU) controls the motor. With an integrated servo control, RPM, power consumption, angle, voltage or temperature are measured and the motor behavior is accordingly controlled.

The challenge lies in the precise balance between the motor and ECU development – and this is already taking place in the early stages of motor design. The aim is to determine the distribution of effective magnetic flux in q and d-directions, the associated power, the generated torques as well as the resulting voltage. The subsequent tables (also called flux tables) are used by the ECU developer to optimally tune the motor’s electronics, thus achieving maximum efficiency.

**imc Meßsysteme GmbH, Berlin, Germany**

For over 25 years, imc Meßsysteme GmbH has been developing, manufacturing and selling hardware and software solutions worldwide in the field of physical measurement technology. Whether in a vehicle, on a test bench or monitoring plants and machinery – data acquisition with imc systems is considered productive, user-friendly and profitable. So whether needed in research, development, testing or commissioning, imc offers complete turnkey solutions, as well as standardized measurement devices and software products.

imc measurement systems work in mechanical and mechatronic applications offering up to 100 kHz sampling rate per channel with most popular sensors for measuring physical quantities, such as pressure, force, speed, vibration, noise, temperature, voltage or current. The spectrum of imc measurement products and services ranges from simple data recording via integrated real-time calculations, to the integration of models and complete automation of test benches.

Founded in 1988 and headquartered in Berlin, imc Meßsysteme GmbH employs around 160 employees who are continuously working hard to further develop the product portfolio. Internationally, imc products are distributed and sold through our 25 partner companies.