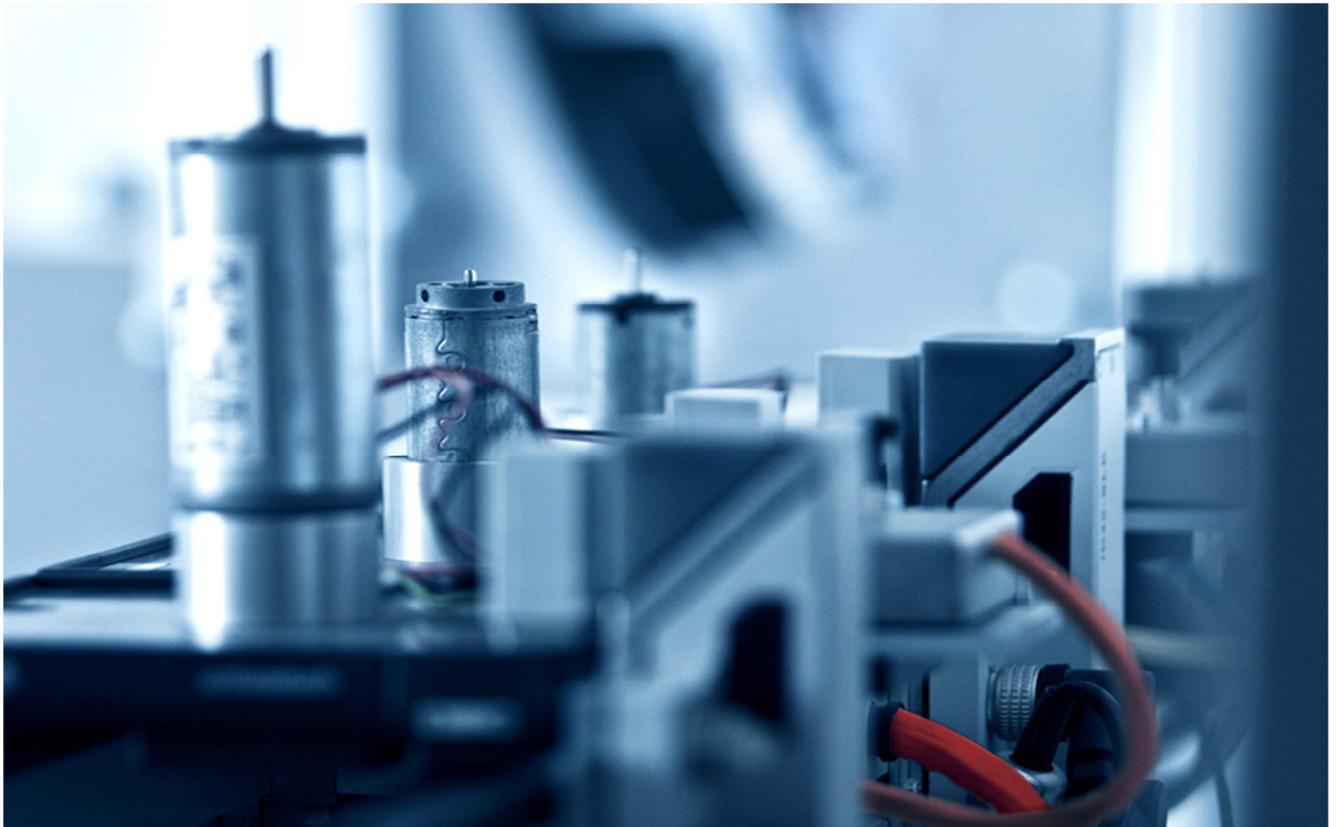


Modularly Expandable EC-Motor Test Stand for Driving Dynamics and Steering System Components

Application Note



imc offers a comprehensive inspection concept for EC-motors

The relentless growth in the market for high-tech “Steering-By-Wire” systems such as EPS (Electric Power Steering) and AFS (Active Front Steering) is accompanied by ever increasing complexity of inspection requirements. In this context, test stations provide major advantages over test drives in terms of time investment and measurement reproducibility. Since the steering system is the interface between the driver and the road, the electric motors used for this purpose must be extremely reliable.

Development and testing of the EC-motors used consequently make the most demanding requirements of precision. Both manufacturers and purchasers of motors, therefore, rightly demand test stations adapted to their special requirements. Besides performing standard measurements, test

systems must also provide the ability to freely define measurement procedures in order to be able to perform custom measurements. Test station technology with this capability is right at home at imc.

EC-motors for more safety and comfort

Modern semiconductor technology has made electromotors with electronic rather than mechanical commutation possible.

Thus, one of the electromotor’s most defect-prone parts is eliminated, to the benefit of the system’s service life and reliability. Additionally, EC-motors allow parameter variation via the control unit, so that a variety of programs simulating driving behavior, ranging from sportingly aggressive to comfortably gentle, can be set. This makes these motors the perfect kind for “Steering-By-Wire”.



Customized and modularly expandable test Stations

The inspection concept implemented by imc lets the system be equipped with hardware components according to the customer's individual requirements, thus, can be optimally adapted to any test object. For instance, the customer's controller can be used, as well as a standard controller. Furthermore, the input ranges for voltage, current, RPM and torque can be configured according to the customer's wishes. The system can be modularly expanded at any time, in case bridge measurements or other measurement quantities such as temperature and vibration are needed. Even temperature control of the test object can be provided if desired.

An extensive range of standard inspection procedures

The imc CRONOS-PL measurement system, plus the analysis software imc Online FAMOS, make up the heart of the test station, by which all necessary measurement quantities are acquired and the entire control of all system components is provided. With the standard inspection

procedures—of which all can be assigned specific parameters—derivative results are then calculated directly from the measured values. Alongside the generator voltage from the external drive, RPM-to-torque characteristic curves and simulation of specific load profiles, the difficult determination of cogging torque is also included. For this, the torque is determined along the circumference at different angle resolutions, with a model-based correction of the axle offset error.

Conducting endurance tests and defining one's own personal test procedures

Besides providing the ability to perform standard tests, the system also has a standardized interface for defining and carrying out other measurement procedures. Such procedures, as well as the standard tests, can be run as endurance tests of a user-defined number of cycles. The test station's operating software is database-supported and additionally offers a retrieving system for finding and displaying measurements. This ensures that all of a measurement's settings can be reconstructed at a later date, and leaves the user free to devote all efforts toward the actual testing process.

