Torque Determination without Torque Measuring Shaft

Torque and speed from motor current and voltage with Precision Power Meter LMG450/LMG500

Measuring of torque in the control cabinet!
1. The knowledge about torque of motors often allows deep insight of the driven process. With mechanically operated stirring and mixing units you can appoint the viscosity of the ready mix by the driving torque. Taking samples for analysing and therewith breaking process will be omitted.

2. Production flow can be controlled more effectively if efficiency degree of the driving motor is known. Especially with pump drives the hydraulic operation point can be set through the fed mechanical power.

3. To avoid down times maintenance should only be done if possible when the admissible limit of deterioration is reached. The exact identification of the deterioration through change of bearing friction is essential for the use of this maintenance concept.

The examples show the huge possible advantages of torque and power measurement at different drives. A classical torque shaft is often not convenient for this application. Fitting of a mechanical measure shaft demands more costs and in most cases you can not retrofit it because of shortage in space. A mobile monitoring set demounting the drive also doesn’t serve avoiding downtime.

Therewith the huge application field for priceless and portable torque and power measurement in middle accuracy has been opened: An elegant mathematical operation in the software of precision power meter LMG450 and LMG500 by ZES ZIMMER calculates the torque at the shaft of asynchronous machines and the actual rotation speed regarding slip. For this you don’t need any mechanical encroachment and no calibration of the uncoupled motor. The voltage and current measuring for regular power is fully sufficient for the measurement. Current measuring can also be done without detaching connections by use of high precision current clamps.

To determine torque with typical 2% uncertainty you only need to insert nominal motor data from the type plate into a input mask of the LMG. The torque and speed determination is functioning with motors at mains as well as at frequency inverters and therewith it is universally useable.

The mechanical data are calculated continuously in every measuring cycle (beginning at 50ms) and are available over interface and on display. This also enables the analysis of the dynamic performance (vibrations, resonances) in the operating range of asynchronous motors.

Determination of torque and rotation speed of motors acc. IEC 38, fed by frequency inverters or directly by 3-phase net. Calculation by means of electrical measurements of LMG and catalogue data of motor without any use of mechanical torque and speed sensors. Measurement inaccuracy between no-load operation and 1.5 fold nominal torque typical below 2% of nominal torque resp. of rotation speed.

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