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Press Release

Understanding AC motor control models

01 March, 2016: Since the late 1970s, many control models with different names have been developed for AC motors. Examples at SEW-EURODRIVE include V/f control, VFC, CFC and SERVO control.

To achieve clarity among the many designations and abbreviations, SEW-EURODRIVE Mechatronics Engineer **Norman Maleka** explains the basic characteristics of control models based on the example of SEW-EURODRIVE frequency inverters, which cover the entire power and application range – from basic standard, to the toughest technical requirements.

“Up until the 1970s, DC motors were just about the only option for step-less adjustment of speed and torque in industrial applications. Traditional DC motors are prone to wear, which generates both mechanical loads and servicing costs. AC motors, on the other hand, are far more robust and virtually maintenance-free,” states Maleka.

They were, however, far less easy to control, especially when AC control engineering and power electronics were still in their infancy – at a time when there were no digital signal processors and both power MOSFETs and IGBTs were at best theoretical concepts.

Maleka notes that open and closed loop control of AC drives has now become indispensable and is still enjoying highly impressive growth rates in electrical drive engineering. “Inverters with voltage/frequency control are ideal for simple applications such as pumps, fans or basic materials handling technology.”

They are used to drive moderately dynamic AC motors and are essentially based on the proportional adjustment of voltage and frequency. This keeps the flux in the machine constant and maintains the maximum torque. Since the rated flux generates the highest torque per kg of machine, the raw materials used – steel, copper and insulating materials – are at their most effective.

“From the motor perspective, the controlled inverter takes the form of an adjustable socket for mains voltage and mains frequency. This means it is also possible in principle to operate several smaller motors simultaneously with one

inverter. Thanks to their straightforward principle and easy handling, frequency inverters with V/f control are ready to use in a short time. This has therefore become the standard control mode, without speed feedback," says Maleka.

SEW-EURODRIVE uses a mode based on V/f control in its MOVITRAC LTE-B, MOVITRAC B and MOVIDRIVE B frequency inverters for installation in control cabinets, and also in MOVIMOT, MOVIFIT FC and MOVIPRO SDC decentralised drive controls.

During project planning for an electric drive system, Maleka stresses that it is vital to identify the application's control accuracy requirements. If these requirements are transparent and specified, the tailored drive system can be assembled from the necessary components – the gear unit, motor, encoder, inverter and controller.

"The key objective is to include the right components for the specific control quality requirements while also optimising costs. If the requirements are set too high or too low from the outset, this results in unnecessary additional outlay. SEW-EURODRIVE regards itself as a specialist in helping customers select the ideal drive components," Maleka concludes.

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