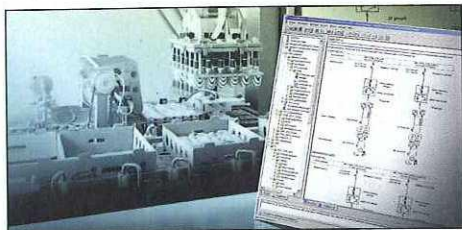


Automation industry brings greener drives faster to the factory floors

By Christoph Hammerschmidt

ENERGY EFFICIENCY REMAINS a paramount topic for all segments of industrial automation. The discussion on efficiency also dominated the recent SPS/IPC/Drives trade fair in Nuremberg. The basic figures are known, but they remain impressive and it is helpful to recall them: electric drives account for two thirds of the energy consumption in the industry. With appropriate measures and technologies, the amount of wasted energy could be reduced very significantly. In Germany alone, 38 Terawatt hours of electrical energy could be saved annually, an equivalent of 15 million tons of CO₂ would be prevented if energy-efficient electric drives were used in industrial applications, said Klaus Helmrich, CEO of Siemens Drive Trains Division.

In order to drive the replacement of less



The Sizer 3.4 software from Siemens enables project engineers to compare two competing drive solutions with respect to energy efficiency.

efficient motors against state-of-the-art drives, standards body IEC plans to exchange the old EFF1 and EFF2 efficiency classifications by a new system with three segments – IE1 will be the lowest classification, it stands for motors with “standard efficiency”. The IE2 level corresponds to “high efficiency” and IE3 to “premium efficiency”. The two upper IEC designations will correspond to the new EPA and NEMA Premium levels of the American NEMA system. Effective June 16, 2011, vendors in Europe will only be permitted to market motors meeting at least the IE2 efficiency rating. Similar guidelines will apply in the USA and China.

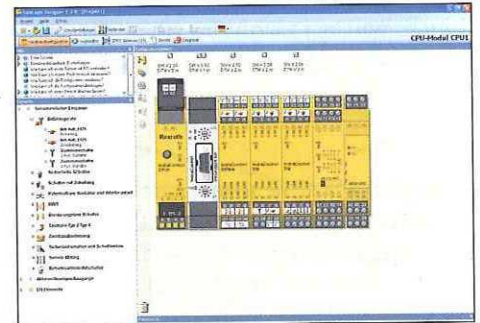
Besides the motors, drive controls are another starting point to improve energy efficiency in electric automation: In traditional control architectures, motors know only two states: on or off – and when on, they are work-

ing at full power. Typically, the actual power control in such control loops is implemented by mechanical actuators. In the case of an hydraulic installation, these actuators can be valves.

A more energy-efficient approach is to control the motor's rotating speed and thus the output power by means of the supply voltage frequency: High frequency equals high rotating speed and, in most application cases, high power. In many drive applications, the deployment of inverters that control the supply voltage frequency can improve the efficiency and reduce power consumption. Siemens promises savings on the electricity bill of up to 70 percent to users of selected applications. Frequency converters thus play a major role in energy-efficient drive concepts, Helmrich said. At the fair, Siemens showed a broad range of low-voltage frequency converters with output powers of up to 2700 kW.

Safety is another big topic in industrial automation. At the fair in Nuremberg, automation solution provider Bosch Rexroth introduced its SafeLogic programmable safety control which meets SIL3 and EN ISO 13849-1 functional safety standards. According to the company, the control covers all vertical segments of factory automation. With its modular design, the solution can grow along with the scope of periphery signals and can be programmed via graphical wiring for function blocks. Configuration of peripheral units is done by drag & drop; a number of interface modules including Profibus and Profinet facilitate the exchange of control data and status information between the safety controller and the overall control unit.

Drives, actuators, sensors, and factory-floor control units along with their respective operating units are networked, traditionally by means of field bus systems and increasingly by means of Ethernet in several real-time flavors optimized for industrial applications. The tendency goes toward extending the Ethernet connection down to the sensor and actuator level. An example is Wenglor Sensoric GmbH which showed a number of sensors for direct connection to Ethernet/IP, Profinet



Bosch Rexroth's SafeLogic adds safety functions to existing automation solutions.

or EtherCat, three of the most widespread realtime-enabled Ethernet variants. Since the Ethernet connection offers high bandwidth, such solutions are aimed at sensor types which generate high volumes of data, for instance, OCR cameras or barcode readers. For the power supply, the products support Power over Ethernet (PoE), fed through a rugged M12x1 Ethernet cable.

The Safety-over-EtherCat bandwagon sees increasing popularity in the industry. At the fair, several vendors announced support for the safety protocol or new related products. IXXAT GmbH offers technical support during design and certification for customers who are developing their own Safety-over-EtherCat based safety software. 3S-Smart Solutions GmbH says it can connect the CoDeSys Safety Editor to the decentralized Safety-over-EtherCat, enabling CoDeSys users to complement their control systems with functional safety without the need to develop and certify their own software.

In order to counter the increasing complexity in drive controls, chip vendor Infineon introduced a microcontroller development kit which supports version 1.1 of the I/O-link communication technology. “Industrial drive control software becomes increasingly complex”, explained Stephan Zizala, Senior Director for Infineon's industrial microcontroller segment. “Since many software providers and system integrators in this segment are small and medium-sized companies, complexity becomes a problem. In particular, software evaluation gets very time consuming.” For this reason, Zizala says, the ecosystem is an important factor when designers select a microprocessor. ■