



Comprehensive cardiac catheter testing

PC- and EtherCAT-based control system improves testing procedure and ensures maximum quality

Boston Scientific Corporation in Marlborough, Massachusetts, USA, is one of the world's largest manufacturers of medical technology devices and products for diagnosing and treating cardiac, digestive, pulmonary and vascular diseases, to name just a few. To ensure that customers and patients receive products that meet the strictest quality guidelines, the company employs PC- and EtherCAT-based control technology from Beckhoff in its testing stations for cardiac catheters.





At the heart of the torque tester is a CX1020 Embedded PC which controls all test functions that are required for the qualification process.



Every cardiac catheter is subjected to extensive testing under cleanroom conditions before it leaves the factory.

Modern medical diagnostic and therapy applications employ a wide range of medical equipment and devices. Before they can be used on patients, however, they must pass a stringent inspection process for quality assurance. "This is a field where we excel," says Roberto Listek, Principal Equipment Engineer at Boston Scientific. "We place great value on continuously improving our testing procedures and employing state-of-the-art technologies, which is why Boston Scientific uses a PC-based automation platform in its torque tester device for cardiac catheters."

Cardiac catheters are used to diagnose and treat many cardiac and circulatory diseases. The catheter – a thin plastic tube – is guided through the patient's blood vessels to the coronary arteries or cardiac chambers. To ensure the catheters work properly as they are being navigated through the patient's arteries even under difficult conditions, they are subjected to stringent stress tests, with the final step employing a torque testing device. This type of test measures the rotational response at the distal end of a device while it is being rotated at the proximal end – an important value to know when operating a catheter during a medical procedure.

PC-based platform meets all flexibility and reliability requirements

Boston Scientific had to accommodate a relatively short timeframe for developing and implementing the torque tester. Nevertheless, the list of technological requirements grew longer and longer as the project progressed. "It included, among other things, a stable control platform without any rotating media or fans. In terms of software, the engineering platform had to be based on the IEC 61131-3 standard. The PC-based control system from Beckhoff met these and other requirements," says Roberto Listek.

Boston Scientific's torque tester is controlled via a Beckhoff CX1020 Embedded PC. Since it is fanless and uses a Compact Flash card as a storage medium instead of a rotating hard disk, it met the requirement to have the fewest possible moving parts in order to maximize reliability. "The Beckhoff platform provides a wealth of standard connectivity options, such as integrated USB and DVI ports, which enables us to simply plug in a USB stick to call up system data for reference purposes," explains Listek. "We then combined these hardware functions with TwinCAT, the powerful automation software from Beckhoff and Windows XP Embedded as the operating system to create



The torque tester's HMI clearly displays test results and system status information.

a testing system that meets all our requirements." Roberto Listek continues: "The TwinCAT programming environment provides a simple and efficient way to implement all necessary functions. For example, with a simple function block in TwinCAT, we were able to cover our automation requirements as well as resolve earlier problems with data mapping and logging during tests." With industrial Ethernet as the system bus, the system's communication runs through a series of EtherCAT I/O modules, including various digital and analog inputs and outputs, as well as an EL6751 CANopen master terminal. "Since the system had to be able to process large amounts of test data quickly and efficiently, the high-speed communication and superior data acquisition capabilities, enabled by the EtherCAT Terminals, provide the best possible solution," adds Listek.

High-performance testing system ensures high-quality medical products

"By implementing a PC-based control system from Beckhoff, we were able to develop a system that fully meets our requirements for comprehensive quality testing in terms of reliability, simplified data acquisition and efficient

performance. As the needs of the medical technology industry keep increasing and changing, Boston Scientific is definitely ready for the future," concludes Roberto Listek.

Further information:

www.bostonscientific.com

www.beckhoffautomation.com