



Quick coupling from Eaton helps keep CT scanners up and running

Location:

Berea, Ohio

Segment:

Medical Equipment — Imaging

Challenge:

Allow technicians to replace X-ray tubes in medical imaging equipment, such as CT scanners, while minimizing the risks and consequences of coolant leaks

Solution:

A quick-connect coupling system that maintains a secure seal under high operating stresses

Results:

Prevention of coolant leaks that can affect machine performance; protection for clean environments in medical facilities; longer service life for imaging machine components

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Sales and engineering work together to speed new product development

Background

Companies that design and build medical imaging systems help doctors see inside their patients. These manufacturers develop solutions for advancing cancer treatment, radiosurgery, X-ray imaging, advanced mammography, computed tomography (CT) and security applications. And Eaton helps those companies manage what's inside their machines.

X-ray tubes in CT scanners periodically wear out and need to be replaced. There are two primary approaches to attaching cooling systems to CT tubes. The first is to integrate the tube and cooling system into a single unit. This requires replacing the heat exchanger at the same time as the tube, even if it is still working correctly. The second is to make the cooling system detachable from the tube allowing for individual servicing of each component.

This second method requires an additional connection point

with the potential for leaks. In a stationary application, that might not be a problem — but CT scanners rotate hundreds of times per minute, placing enormous stress on the connection, and they are used in hospital and clinic settings where cleanliness is critical.

To be practical, a quick coupling would have to protect against coolant leaks during use, which could damage the scanner, and to prevent the introduction of air into the cooling system, which could affect the accuracy of scanner readings.

Challenge

In 2011, as Eaton was finalizing its acquisition of Hansen Couplings, a customer encouraged Hansen to pursue business within the medical imaging industry. Eaton was already conducting open-ended discussions with high-precision manufacturers to discover their priorities, especially technical



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This quick coupling, developed by Eaton, protects against coolant leaks when technicians replace X-ray tubes in medical imaging equipment.

requirements. In one of these conversations, Eaton discovered that an X-ray equipment maker was looking for alternative coupling suppliers for a new CT tube product family.

A sales team from Eaton coupling products called on the manufacturer's engineering development group. The team then called on Aaron Lorkowski, senior product engineer for couplings at Eaton in Berea, Ohio, asking for design prototypes to meet the specialized application. This fast and attentive response impressed the development group, which was already looking at competing products.

Solution

Lorkowski and other Eaton engineers studied the forces created by the gantry mechanism in a CT scanner, the physical properties of the coolant, and the methods used by service technicians when they replace X-ray tubes. Meanwhile, the sales team developed the business case for using a quick coupling system from Eaton.

Designed to meet or exceed all the customer's technical requirements, a new coupling from Eaton would last five years or longer in field use. It would allow on-site servicing with minimal disruption to medical operations, and help maximize machine uptime for diagnostic facilities. By extending the useful life of heat exchangers, the coupling would pay for itself quickly.

Results

This new application for quick connectors is opening a new market for Eaton. The company has always looked for different ways of matching its capabilities to customer needs, even with industries where Eaton is not well known.

According to the lead engineer for the customer's development group, the response he received from Eaton gave him confidence in the company as a trustworthy supplier — and the performance of the quick disconnects made his choice clear. "Eaton sales and engineering staff members were always quick to respond when I had questions or problems during product development."

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