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Great Connections

A sleek, user-friendly connector played a key role in the redesign of a thermal cautery unit. Turn to page 80 to learn how Geiger Medical's partnership with Lemo turned a device in decline into an award-winning success story.

Bearings

Self-lubricating bearings suited for low- to medium-load applications are stocked in more than 300 sizes.

Supplied by **Igus** (East Providence, RI), the bearings are made from a thermoplastic alloy and are designed to replace sintered bronze bushings. Advantages of the M250-series bearings, according to the firm, include impact and wear resistance and vibration-damping properties.

Laser Marking

A high-speed UV laser provides permanent tamperproof marking for medical devices and pharmaceutical products. The Cold Laser Marking System from **Tri-Star Technologies** (El Segundo, CA) can be used to mark the interior and exterior of device components without causing damage to thin or thermally sensitive substrates.

Ceramic Components

Advanced ceramic, ruby, and sapphire components are supplied for use in pistons, check valves, and rotors and stators. The inert materials are biocompatible and withstand exposure to harsh solvents. **Maret S.A.** (Böle, Switzerland), which is certified to ISO 9001:2001 and ISO 14001:1996, produces precision custom parts in the hard materials for medical device OEMs and other high-tech industries. Reader Service #3



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The Right Connections Put a Thermal Cautery Device Back on the Winning Track

A supplier of high-tech ergonomic connectors played a key role in reviving the fortunes of a TCU facing extinction

It's often said that you're only as good as your supplier. John Bottjer, president and owner of **Geiger Medical Technologies** (Monarch Beach, CA), found out just how much wisdom there is in that statement. His company's Thermal Cautery Unit (TCU) had not been updated in more than 40 years, and its age was becoming a handicap in the marketplace. A redesign "was a matter of survival for Geiger," says Bottjer. "The unit had stable sales with little growth potential," he says, adding that prospects for its long-term survival were grim.

The TCU is used by physicians to stop patient bleeding and to destroy lesions by applying high levels of heat through a wire. It sounds simple enough, but Geiger's existing device

had a number of inherent problems. One challenge that Bottjer faced was finding a supplier of connectors willing and able to help him address a combination of aesthetic, ergonomic, electronic, and materials issues within a tight budget and narrow time frame.

Market research conducted on the TCU led Bottjer to conclude that "many physicians feel that there is less tissue destruction with thermal cautery units than with high-frequency electrosurgical devices, and that patients experience less pain and heal faster, with fewer scars." This encouraging research convinced him that time to market was critical and that he needed to find an appropriate supplier quickly. While attending the MD&M West show in Anaheim in 1999, Bottjer stopped by the booth of **Lemo USA**

Inc. (Rohnert Park, CA) and met with some of the company's engineers. They answered his questions, demonstrated how they would solve his unique connector-design problems, and delivered a prototype within days after the show.

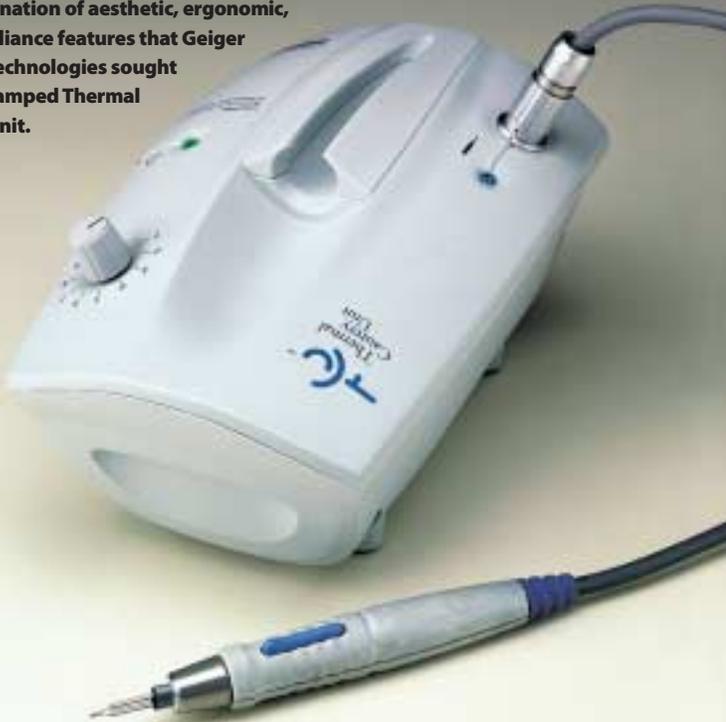
An Auspicious Debut

The Geiger TCU 150 was officially introduced at the American Academy of Dermatology's 2001 annual meeting in Washington, DC. The following year, the device was named a winner in the surgical equipment, instruments, and supplies category of the Medical Design Excellence Awards, a program sponsored by Canon Communications LLC, which also publishes *MPMN* and organizes MD&M West. Among other things, the panel of judges noted Geiger's innovative use of materials and the ability of its product development team to overcome design and engineering challenges to meet clinical objectives.

Following its market introduction, sales of the TCU skyrocketed 600%. It became the unit of choice with its core audience of dermatologists, surgeons, and veterinarians, while its use expanded into ENT, urology, podiatry, plastic surgery, and international markets. Bottjer believes that the connector was, in no small way, one of the major factors in the TCU's success.

Headquartered in Switzerland, Lemo is dedicated to finding solutions through a well-developed design architecture that has been its signature for more than 50 years. By drawing on the company's resources and applying their expertise, engineers were able to quickly design a simple, easy to connect and disconnect male-female push-pull connector for the cautery unit's hand piece and receptacle. With this basic foundation in hand, the team could focus on resolving a set of aesthetic, ergonomic, material, and economic

Connectors supplied by Lemo present the combination of aesthetic, ergonomic, and compliance features that Geiger Medical Technologies sought for its revamped Thermal Cautery Unit.





Lemo's easy to connect and disconnect push-pull connectors are available in more than 55,000 off-the-shelf versions.

issues while meeting the requirements of the medical electrical equipment standard, IEC 601-1.

Aesthetics plays an important role in a product that is marketed to physicians for inpatient care and that is visible to the patient during treatment. The previous cautery unit looked outdated and unfriendly, and the design of the hand piece had a negative impact on the patient. The Lemo component has an eye-appealing matte brushed-chrome finish on the outer connector with a polished brass-chrome plating, tested to MIL-STD-1344A for moisture resistance, lining the inside shell. Its attractive, high-tech look exemplifies the modern, advanced TCU.

Because the physician constantly removes and replaces the hand piece, Geiger also sought to simplify the latching mechanism and improve its ergonomics. The TCU now sports a one-piece Lemo connector (in lieu of two connectors in the previous model), and the split hand-piece cables of the old model

have been replaced by a single, flexible, multi-wire cable. Lemo's standard push-pull latching mechanism requires no threading or coupling notch; consequently, no extra space is needed to manipulate the connector, nor are special tools required. To mate the connector, the user simply lines up the keys and clicks them into place. To disengage, he or she simply pulls on the shell of the male connector to retract the latch ears and pull the keys out of the alignment groove. Lemo connectors are rated to 5000 mating cycles.

Off-the-Shelf Solution

Because the TCU has to maintain the desired temperature of 2200°F during tissue contact, Geiger required a high current rating of 10+ A in a connector with only two contacts. Since most products don't need that much current, connectors typically use smaller-gauge wires. Lemo, however, was able to use an off-the-shelf connector that required no modifica-

tions—one of 55,000 available—with standard contacts for two large-gauge wires able to carry the required current. Embedded within the metal shells, the two contacts are isolated from each other and from the shells by means of a plastic insert, allowing current to travel through the contact without causing the device to short out or to give the user an electric shock.

It was equally important to source a material for the hand piece that would withstand steam sterilization and not corrode after autoclaving or coming into contact with body fluids. This is achieved by the use of the plastic insert mentioned above, which is molded from PEEK, a material that many connector suppliers refrain from using because of its cost. However, PEEK is dimensionally stable across a broad range of temperatures, preventing contacts from moving and shorting out. Easy to mold, PEEK can also be used with a wide range of materials. Because it uses large quantities of PEEK, Lemo is able to negotiate a reasonable price for the material and maintain competitive rates for its connectors.

Which brings us to the final question of economics. The cost of the hand-piece connector needed to be within a certain price range, and replacement units had to be readily available for distribution. Lemo considered itself to be in a partnership with Geiger, and it developed an annual purchase plan, which not only guaranteed affordability and production, but also solidified delivery dates for the following year.

"Everyone at Lemo—sales, engineering, customer service, and purchasing—was tuned in to our needs from the beginning," says Bottjer. "The experience exceeded our expectations. The Geiger TCU 150 has realized zero rejected parts from Lemo and zero field failures related to the connector." And the high-tech look and feel of the connector sends just the right message, adds Bottjer, "convincing the doctor that he has purchased a top-notch device."



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