Coupling System for Leadless Implantable Medical Devices

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Eases Component Replacement - Reduces Tissue Damage Risk

This technology enables two-part implantable medical devices. A first part of the coupling system is permanently attached to organ tissue. A second detachable part of the coupling system connects replaceable components to the first part.

A prototyped implantable cardiac pacemaker features two components: a pacemaker and a battery. The two components are connected by a Liquid Crystal Elastomer (LCE) coupling mechanism that enables minimally invasive battery replacement without disruption of the pacemaker that remains permanently installed in the heart muscle.

Advantages:

- **Retrievability:** Dual-mechanism design permits ease of replacement for power source
- **Minimizes Mechanical Parts:** LCE coupling mechanism is electrothermally controlled, providing for powerful device operation without mechanical components
- **Two-Part Design:** Coupling mechanism permits two-part design – one for permanent installation of the device and another for the fungible power source and replaceable parts.

Applications:

- Cardiac: Pacemakers, Defibrillators, Stents
- Implantable Insulin Pumps
- Cochlear Implants
- Gastric Stimulators

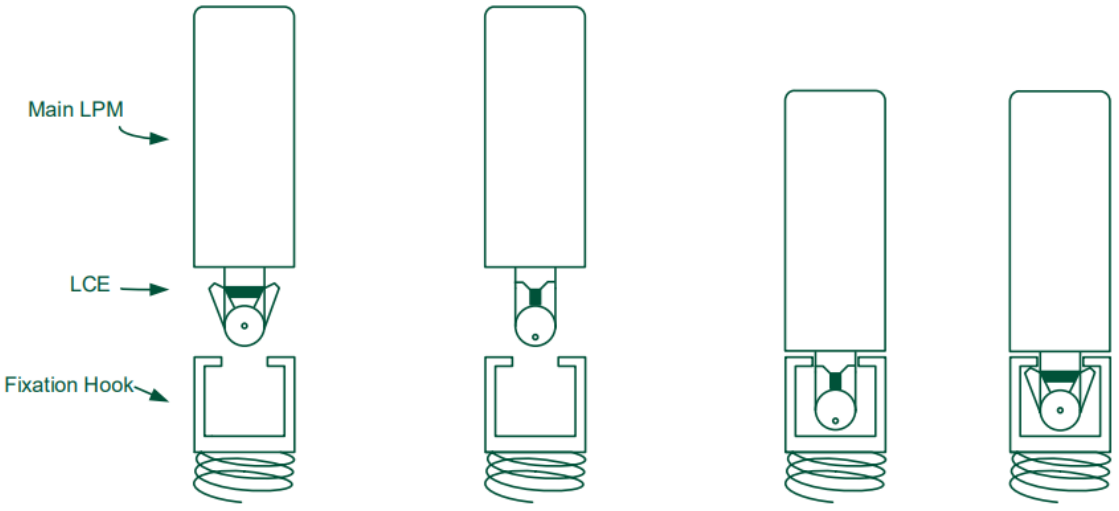

Figure 1: Relaxed Figure 2: Ready for attaching Figure 3: Attached Figure 4: Locked

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