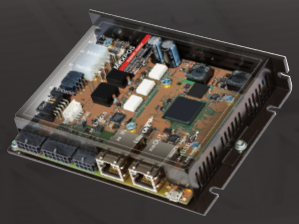
Maxon motor has launched the MAZPOS 50/5, a compact EtherCAT Slave, unveiling possibilities for precision, dynamics, and synchronization.



Process Sensors' new self-contained pyrometer models, the stand-alone PSC-SR54N and PSC-SR54NV, have temperature ranges from 500° to 3,000°C.

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JUNE 2014 69TH YEAR, ISSUE 5

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MORE THAN **65** NEW PRODUCTS

Powering Remote Wireless Devices for 40 years

Bobbin-type thionyl chloride (LiSOCL2) batteries enable remote wireless devices to operate maintenance-free for up to four decades.

By Sol Jacobs, VP and General Manager, Tadiran Batteries

Selecting the ideal power management solution is a critical design consideration, especially for remote wireless devices intended for use in harsh environments. In many instances, these devices are off-the-grid, thus requiring self-contained power in hard-to-access locations where battery replacement or recharging are not options.

Lithium chemistry remains the preferred choice for remote wireless applications due to its intrinsic negative potential, which exceeds that of all other metals. The lightest non-gaseous metal, lithium offers the highest specific energy (energy per unit weight) and energy density (energy per unit volume) of all available battery chemistries. Lithium cells are all non-aqueous, and have normal OCVs of between 2.7 and 3.6 V. The absence of water allows lithium chemistries to operate in more extreme temperatures.

While numerous lithium chemistries are available, lithium thionyl chloride (LiSOCL2) chemistry stands apart due to unique performance attributes that make it ideal for applications such as electronic toll tags, RFID, environmental monitoring, SCADA, mil/aero, smart grids, automatic meter reading (AMR), wireless mesh networks, system control and data acquisition (SCADA), data loggers, measurement while drilling, oceanographic measurement, and emergency/safety equipment.

LiSOCL2 batteries are constructed two ways, using spirally wound or bobbin-type construction. Of the two alternatives, bobbin-type Li/SOCL2 cells deliver the higher energy density (1420 Wh/l) along with higher capacity, as well as the ability to withstand more extreme temperatures (-55°C to 150°C), with specialized models adaptable down to cold-chain temperatures of -80°C.

A key attribute of a bobbin-type LiSOCL2 cell is a very low annual self-discharge rate (less than 1 percent per year), which is crucial to offering 40-year operating life, as the total lifetime self-discharge of the battery is often greater than the total amount of energy consumed by the device. Self-discharge is governed by the chemical composition of the electrolyte, the manufacturing processes used, as well as mechanical and environmental considerations. Self-discharge can be accelerated by high levels of impurities in the electrolyte, as well as through internal impedance, which can be controlled by blending special additives into the electrolyte.

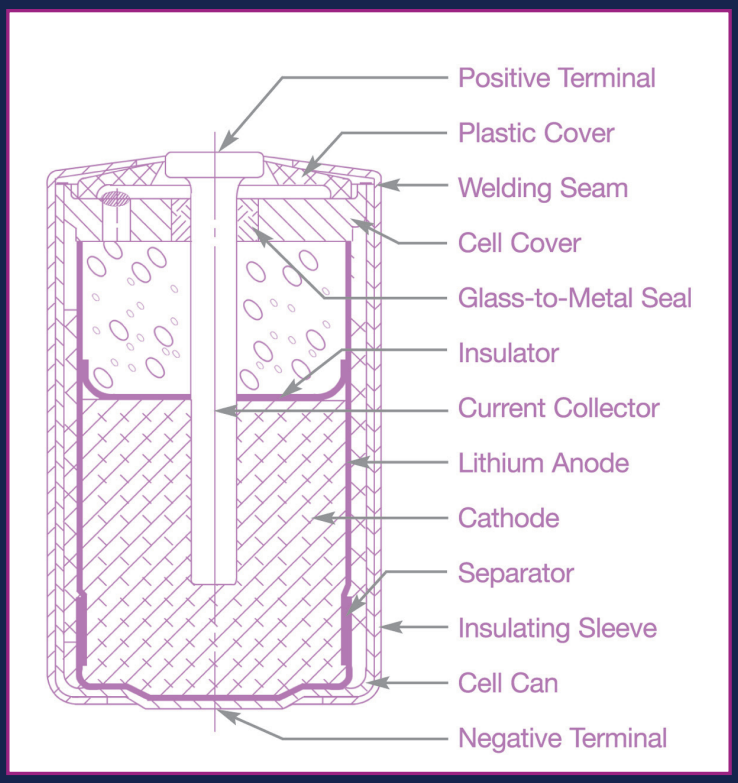
High Pulse Applications

Numerous parameters influence the battery selection process, including:

- Energy consumed in dormant mode (the base current).
- Energy consumed during active mode (including the size, duration, and frequency of pulses).
- Storage time (self-discharge during storage diminishes capacity).
- Thermal environments (including storage and in-field operation).
- Equipment cut-off voltage (as battery capacity is exhausted, or in extreme temperatures, voltage can drop to a point too low for the device to operate).
- Battery self-discharge rate (which can be higher than the current draw from actual use).

If the wireless application involves dormant periods at elevated temperatures, alternating with periodic high current pulses, then lower transient voltage readings can result during initial battery discharge. This phenomenon, known as transient minimum voltage (TMV), affects bobbin-type LiSOCl2 batteries due to their low-rate design.

One alternative is to use PulsesPlus lithium thionyl chloride batteries that combine a standard long-life bobbin-type LiSOCL2 cell with a patented hybrid layer capacitor (HLC). The battery and HLC work in parallel, with the battery supplying long-term low-current power while the HLC supplies pulses up to 15 A, thus eliminating the voltage drop that normally occurs when a pulsed load is initially drawn. The single-unit HLC works in the 3.6 to 3.9 V nominal range to deliver high pulses and a high safety margin, thus avoiding the balancing problems, current leakage, and bulkiness associated with supercapacitors.



When low to moderate pulses are required, Tadiran Rapid Response TRR Series batteries could offer a solution. These batteries do not require the use of an HLC but deliver high capacity and high energy density while virtually eliminating TMV and power delay issues that affect standard LiSOCL2 batteries when they are first subjected to load. TRR Series batteries use available capacity efficiently to extend battery operating life up to 15 percent in certain instances, including extreme temperatures.

Evaluating Battery Suppliers

Bobbin-type LiSOCl2 batteries made with high-quality materials and advanced manufacturing techniques can reduce the potential for electrolyte leakage, short circuits, and batch-to-batch inconsistency that can shorten service life. The annual self-discharge rate can vary from less than 1 percent per year for a leading brand to as much as 2.5 percent to 3 percent per year for a lower quality product. As a result, design engineers need to be extremely wary of battery manufacturer claims regarding low annual self-discharge at ambient temperatures, which may not be valid depending upon the size of the battery, its method of construction, or environmental considerations, as the difference of just a few microamps in annual self-discharge rate can translate into years of battery life expectancy.

To authenticate product quality and traceability back to the raw materials, potential battery suppliers should be required to submit multiple customer references along with fully documented and verifiable test results for battery pulses, low-temperature pulses, discharge, and repeatability.

Careful due diligence during the vendor selection process will ensure reliable, long-term power. PDD

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40

YEAR

OPERATING

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And keep them running until 2055.

The battery of the future is here today. Tadiran bobbin-type lithium thionyl chloride ($LiSOCL_2$) batteries feature an annual self-discharge rate of just 0.7% per year: so energy efficient that they allow low power consuming wireless devices to operate for up to 40 years on a single battery. No one else even comes close. Tadiran lithium batteries also feature the highest capacity, highest energy density, and widest temperature range of any lithium cell, plus a glass-to-metal hermetic seal for added ruggedness and reliability in extreme environments.

For a battery that lasts as long as your device, run with Tadiran.

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* Tadiran LiSOCL2 batteries feature the lowest annual self-discharge rate of any competitive battery, less than 1% per year, enabling these batteries to operate over 40 years depending on device operating usage. However, this is not an expressed or implied warranty, as each application differs in terms of annual energy consumption and/or operating environment.