

Torque sensors ensure traceability for pharmaceutical bottles

In the rarefied world of pharmaceuticals, traceability applies not only to the products, but their packaging as well. The packaging has to be secure enough to ensure that the contents remain sterile, but has to be easy to open in possibly tense situations.

To this end, Oxford-based Capcoder has developed specialised bottle-capping machines that not only tighten the caps within precise tolerances, but also log every detail of every bottle that is capped.

"Our machines are essentially simple," explains Capcoder's technical director, Roger Brown. "Filled bottles are presented to a torque head, which quickly screws on a cap. A batch size is typically 10,000 bottles, which we have to cap at, say, one per second. Every cap has to be done up to the same torque, and we have to provide proof of this performance. Sterility has to be ensured – the machine may even operate in a high vacuum to ensure that no bacteria or other contaminants are present."

Hospitals may store pharmaceutical bottles for months before using them. To trace each bottle's origin, records need to be produced automatically and stored centrally.

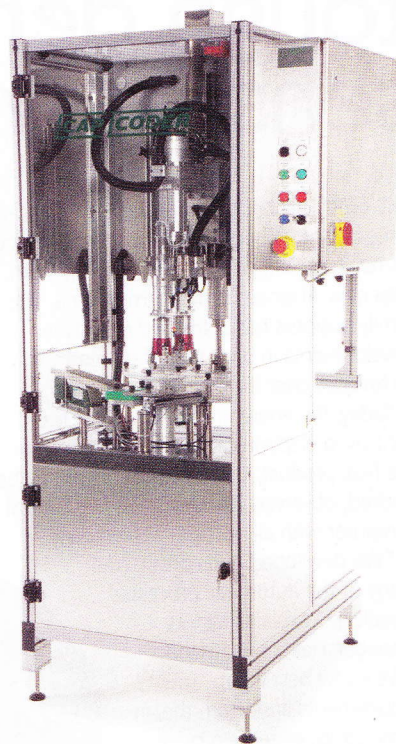
As the need for traceability emerged, Capcoder realised that it would have to develop a standard traceability system which was flexible enough to meet local standards in the different countries that it exports to.

"Our philosophy is to have a simple machine design that avoids extraneous parts," says Brown. "This led us to the idea that we'd like the torque sensor to be wireless."

Looking at various torque sensors on the market, one – Sensor Technology's TorqSense system – met all of Capcoder's needs: it was simple, robust, and could operate wirelessly at high speed. The sensor does not need to make contact with the bottle caps or the shaft of the torque head it is monitoring. Instead it uses a radio frequency link. Two tiny piezoelectric combs attached to the shaft of the torque head form half of a Wheatstone bridge circuit, which is in radio contact with the other half in the main body of the sensor.

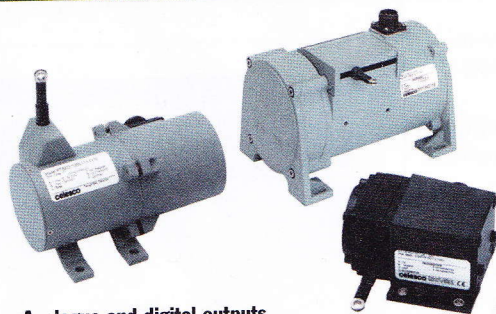
"When the shaft rotates, a phenomenon known as Surface Affect Waves causes one comb to expand and the other to contract, changing their electrical resistance in proportion to the speed of rotation" explains Mark Ingham of Sensor Technology. "This generates a signal indicating the torque."

For the Capcoder application, Sensor Technology recalibrated its standard software and added some front-end graphics. The software runs the torque up to 10kg-cm with a tolerance of 10% and records the value achieved. This ensures that the cap is tight enough to guarantee sterility, yet can be opened relatively easily. The logged values are saved to a hard drive to provide a permanent record for traceability purposes.



Capcoder uses a novel torque-sensing system on its bottle-sealing machines.

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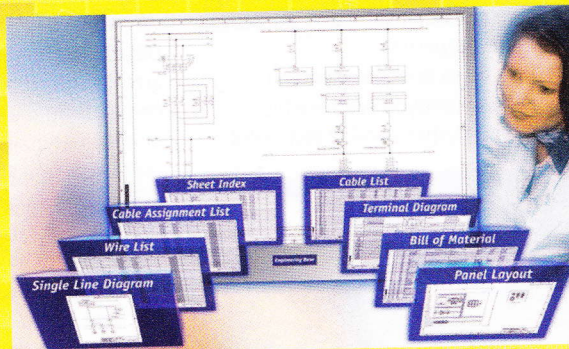


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