The Delcom Technology and Performance Advantage

Disclaimer concerning fairness

In this discussion, we will try to be as fair as possible when assessing our competitors' technology and sensor performance. However, we are a biased source. For this reason, we highly encourage customers to ask our competitors for a free trial. Place the Delcom equipment and our competitor's equipment side by side and see the difference for yourself - the Delcom sensor will outperform the competition every time.

Delcom continues to innovate

Modern eddy current companies are operating based on a technology that was first developed in the 1970s. We regularly purchase our competitors' sensors, test their performance, and reverse engineer them to determine if they have made any innovations worth exploring. In nearly all cases, our competition has not innovated much beyond the original technology.

We have seen little to no innovation in eddy current technology from companies like Napson, Nagy, and others over the last 10 years. We believe this stagnation is due to a belief that the original technology cannot be improved. Not only would this explain the stagnation of their core eddy current technology, it also explains why these companies have branched out into other sensor types and added features of dubious value.

Delcom, on the other hand, is not only the most dominant US-based eddy current company, we are the only company worldwide that focuses exclusively on developing, improving, and selling only eddy current sensors. Each year, Delcom releases an improved version of the core eddy current technology, resulting in incremental but steady performance improvement. Eddy current sensors are all we make—therefore, we know we have to be the best in the world.

Delcom uses superior technology

Each eddy current company has its own proprietary way in which it applies the basics of eddy current technology. There are two general architectures for an eddy current sensor: absolute-type and reflection-type designs. An absolute-type sensor uses one coil to generate the eddy current in the material. The conductivity of the material is measured by observing how hard it is to generate this eddy current. A reflection-type sensor uses one coil to generate a current and a second "pickup" coil to sense the secondary field created by the eddy current in the material. While reflection probes sound promising, they are complicated to make work and do not have the superior performance of absolute probes.

Suragus, one of Delcom's competitors, uses reflection-style sensors. Suragus's sensors require large sample sizes (often this fact is hidden in their marketing material and the customers learns about this only after purchase), have linearity problems, and enjoy lower precision/smaller range due in part to their decision to employ a reflection-style architecture. Suragus is a relatively new company and does not focus exclusively on eddy current technology, so it seems they are willing to accept lower performance.

Delcom, Napson, and Nagy use absolute-style sensors. Napson has focused almost exclusively on the compound semiconductor market. Their product line includes contact and noncontact sensors as well as significant investment in wafer transfer technology. This focus has led them to develop sensors with a narrower range and less precision than Delcom's, and to spend less time innovating on the core eddy current design and more time delivering on features their customer base demands (such as contact options, wafer automation, etc.).

Another key technological choice that eddy current manufacturers must make is whether their oscillator circuit should operate "AC coupled" or "DC coupled. We are not willing to discuss what this means from a design perspective, but we are more than happy to discuss what this means for performance. Nagy is a great example of a company that uses an AC coupled oscillator. Because Nagy uses AC coupled technology, they have not had to work hard to address issues that arise from temperature drift. However, this technology choice has the deleterious effect of dramatically limiting instrument range and precision.

On the other hand, DC coupling introduces vulnerability to temperature drift but greatly increases the range and precision of the instrument. Thirty years ago, Delcom recognized the huge advantage to the customer of a DC coupled oscillator circuit. Delcom has spent the subsequent decades building a one-of-a-kind body of technical knowledge that has allowed us to all but eliminate the temperature drift problems associated with this technical choice. For the customer, this means that Delcom sensors do not have much more drift than the competition but enjoy significant range and precision advantages.

Delcom's performance advantage

Delcom's exclusive focus on eddy current technology and commitment to innovation over 30 years translates to superior performance in every aspect of our sensors.

- *Accuracy:* Delcom guarantees 99.9% accuracy.

- *Range:* Delcom has the largest dynamic ranges without requiring the user to switch sensors. We are able to provide larger ranges, with more significant digits at each order of magnitude, than any other company.

- *Linearity:* Delcom sensors are extremely linear. This means only one standard is required to calibrate an instrument across its entire range. It also means the sensor does not need to be recalibrated each time the user changes between reading high and low conductance materials.

- *Repeatability and reproducibility:* Delcom sensors have some of the best repeatability and reproducibility performance in the industry.

- *Modular & durable design:* Delcom has designed its sensors in a manner that nearly eliminates the need for repairs or service. The sensor can be easily removed and

swapped for a newer or different range or configuration. The instruments never need calibration and many instruments operate perfectly even after 30 years of use.