



inGen Linear Direct Press Release

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INPROX Sensors, a Boston, Massachusetts based sensor technology company, is proud to announce the next generation, square wave output, digital sensor technology platform, inGen Linear Direct™, for applications in automotive, aerospace, medical device and appliance markets

inGen, is a revolutionary, patented technology suite of continuous output, harsh duty, non contact, precision sensors. These digital sensors run on an innovative IC capable of interfacing directly with microprocessors without the need of any signal conditioning; internally or externally. Offering new capabilities in the areas of position, speed, temperature and pressure, inGen sensors utilize 'frequency of oscillation' to provide an output in the form of a square wave that is read as a pulse train by digital microprocessors.

"With today's microprocessors and the ability to measure thousands of Hertz; the resolution and dynamic response is an order of magnitude better than existing technology," Derek Weber describes. "The key is the way in which the inGen signal is generated in the first place", states Weber, "a sensor without the need for any signal conditioning".

Developed as a low cost - high performance sensor system for demanding aerospace and automotive applications, inGen Linear Direct technology offers the capabilities to replace less responsive analog technology, as well as, provide new sensing options in applications yet to be solved.

Direct digital sensing with its micron resolution precision measurement (on both ferrous and non-ferrous targets) and error free communication capabilities has shown itself capable of providing highly compartmentalized output ranges over multiplexed channels. Programmable frequency groups, such as; temperature and position on the same carrier signal enable multiple sensor outputs on the same signal.

Readily adaptable to digital control equipment, inGen improves the reliability of systems and reduces sensitivity to electrical noise, temperature drift and variations on the ground bus. Direct digital technology in fact produces higher precision sensing resolution, better dynamic response; greater linearity, durability, longer mean time before failure, lower hysteresis, higher stability, more immunity to interference, an easier process of transmission and extended capabilities for multiplexed signals.

Higher dynamic bandwidth and higher dynamic response rates also apply. Immunity to interference has also been a requirement that customers across the board have prioritized, according to INPROX technologists; and since the technology is time based, amplitude, and the shape of the signal do not matter much, thus interference, which effects more of the amplitude of a signal, has little impact on signal quality.

"Our natural square wave output coupled with this kind of performance/cost dynamic is really interesting to our customers. We have seen our partners move quickly on this; engineers and purchasing managers got a real sense of what kind of capabilities are possible at extremely competitive prices", says Derek Weber, Vice President Sales North America for INPROX Sensors.

Additional features which provide further market differentiation are the multi-function sensing and multi-channel signal capabilities inherent in a time based system. For example by utilizing the multi-function sensing aspect, as in the case of an inGen special position sensor; a position status update every oscillation clock of the sensor creates a signal refresh rate of 25KHz to 500KHz. First, second and third order

derivatives of the position information provide the opportunity to measure position, acceleration, velocity and jerk in a single measurement. With multi-channel signals added to the mix different physical quantity can use different bands of working frequencies with temperature and position in separate locations. This creates multiple distributed sensors, all on a common signal bus.

Standard analog methodology requires A/D signal conversion; if the underlying signal is unstable and prone to error, then the pulse train will only multiply and compound these errors and inaccuracies. Analog sensing can be like trying to see through a dirty window when your fundamental bit information is inaccurate. Direct to digital outputs create a reliable pulse train where compounded error terms that are the cause of most inaccurate and unstable sensor signals are no longer an issue.

inGen Linear Direct offers higher dynamic response because it usually works in a higher frequency range. This is relative to the speed of the mechanical movement in speed measurement applications. For example, if a motor rotates at a speed of 12,000 RPM it is considered to be operating at a high rate of speed. However, in terms of frequency, it's only 3,600 Hertz. If the inGen sensor works at 240KHz, that's 67 times faster than the rotating speed, and this in turn introduces very little delay in response time, thus higher dynamic response bandwidth.

In the case of speed sensing, inGen opens new possibilities of performance in comparison with Hall and VR sensors such as; zero speed, high temperature operability, angular measurement capabilities, variation in target material, higher noise immunity and an air gap mute feature. These features in addition to the myriad of other digital sensing benefits, creates a real breakthrough for difficult advanced speed applications.

Another benefit inGen technology can offer, is the ability to transcend temperature barriers in measurement applications. This technology developed in part for extreme environments can operate in -110C – 450C (surviving up to 650C) ranges; opening up new locations to receive mission critical data from.

"The most impressive attribute," according to Weber, "isn't just the ability to operate or survive in these temperatures, but especially in the case of the higher temperature side; the strain of cycling through temperatures, actually strengthens the sensor itself." Weber continues, "At the end of the life-cycle of a particular system this might actually be the component in the best shape."

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