



# Quantum Leap for Sensing Systems

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Environmental monitoring and gas sensing is about to become a great deal easier in process industries as a result of a two-year development from Trolex. Mark Rowland, engineering manager at Trolex explains how the new system has been designed.

A wide choice of disparate equipment is presently available for sensing purposes and a typical fixed gas detection system is invariably integrated by a gas sensing consultant, or in the case of large companies, by a dedicated individual or department within the company who would have associated repairs capability, calibration and servicing equipment or would out-source all of this to a specialist support company. Often a full team of electronics and software experts would be required to deliver and support systems, particularly where datacomms or distributed multiple systems were involved. The creation of a system would often require the integration of sensors, controllers, alarms, standby batteries, cabling and accessories from separate suppliers and would need specialists to install and commission. Invariably, this process would continue with on-going technical support throughout the life of the installation.



Figure 1: Mark Rowland, Engineering Manager at Trolex.

## A New and Advanced System Evolves

Through understanding this problem, listening to users and customers, and applying technological developments available, a completely new concept in environmental monitoring, gas detection and machine condition monitoring has come about.

First trialled in the harsh conditions of the tunnelling industry with great success, the system which is UK designed, developed and manufactured, has now, importantly, received ATEX certification for use in hazardous area applications, which will allow its widespread application.

The new system which has emerged – named Sentro 8 – is an integrated multi-purpose sensing station ready to be configured to meet gas detection and condition monitoring requirements without the need for complex investment in system design or the need for specialist back-up.

The system features intelligent, inter-changeable sensing modules served by a universal data communications architecture, making it straight forward to network sensor stations to a master computer and expand the system if required at a later date.

It would be no exaggeration to say that the development is nothing short of a breakthrough for the process industries where a wide variety of sensing principles used to be conveniently combined. It represents a simple and cost effective way to integrate sensors, controllers, alarms and other systems using compact Sentro 8 sensing stations.

Each Sentro 8 can simultaneously monitor the concentration of up to eight different gases or a combination of condition monitoring sensors; ambient temperature, ventilation, air velocity or any choice of remote connected sensors that is required.



Figure 2: The new Sentro 8 is an integrated multi purpose sensing station ready to be configured to meet gas detection and condition monitoring requirements without the need for complex investment in system design or the need for specialist back-up.

## The Benefits to the Plant Engineer

In most process industries, this means that the new system can monitor all types of machine conditions such as temperature, vibration, pressure, flow and speed of rotation, as well as the concentration of dangerous gases in the surrounding atmosphere; methane, oxygen and carbon monoxide. All this in one integrated package.

The benefits are considerable and wide ranging – reduced cabling, installation and commissioning costs, reduced maintenance costs and downtime, a smaller number of failure risk points, improved integration of plant wide monitoring collateral, reduced size, weight and storage requirements, easy and fast calibration without the need to power down and a fully scalable and flexible technology base for responding to, and integrating future requirements. Also the ability to communicate directly with standard protocols means that any number of systems can be integrated, on a single data cable and controlled and monitored from a central location, all of this utilising any standard plant and maintenance skills.

## 'Plug & Play' Simplicity

The development of Sentro 8 has brought about a rugged 8-channel integrated sensor station. Inside, there is a facility for up to eight pre-calibrated sensing modules. These sensing modules are literally intelligent 'plug-and-play' elements each with its own processor for intelligent data storage and signal conditioning circuits. Each has data storage capacity to record up to 4,000 points of data. They are designed to continuously display the data they retrieve, store the full service history such as data logging, calibration, failure modes and alarm settings, and they run comprehensive self-diagnostic checks. They are also designed to be simply replaced with pre-calibrated modules whenever required, making maintenance, service and calibration straight forward.

The compact, high strength IP65, EMC protected housing features a large LCD screen giving high brightness, dot matrix display for clear information about all eight sensor channels with direct on-screen instructions and diagnostic data. Also fitted are, a powerful integral sounder and high intensity warning beacon. A large waterproof keypad provides direct access to the universal programmability and diagnostics of the sensor station.



Figure 3: Environmental sensing modules for Sentro 8, for integral gas sensors.

## Networking Via a Single Data Cable

Increased processing capabilities of the new technology allows the sensors to communicate directly using a standard Modbus protocol, whereas previously conventional analogue signals would have had to go through data conversion modules in order to communicate with datacom systems. Once again the potential benefits within large plants or on multiple sites are huge. This means that Sentro 8 can use a standard RS485 data network to link up to 32 sensing stations into a single cable to a PC running SCADA (supervisory control and data acquisition) software package. The capability of communicating this way over distances in excess of 1 kilometre on a standard cable, allows for ultimate efficiency and one-man supervision.



Figure 4: Remote sensing modules for Sentro 8, for remote sensors connected for local condition monitoring

It is also possible to link the local RS485 / Modbus network onto larger Ethernet networks opening up the possibility of monitoring the Sentro 8 from anywhere in the world via the internet.

### Meeting Safety and Electrical Standards

The Sentro 8 concept has resulted in a system of pure simplicity with no complex functionality, simple two-button programming, and pluggable sensing modules. It is also an example of conformity to the WEEE directives on sustainable product development where a product should be designed to be adaptable for alternative purposes in the future. Any future systems required can be incorporated into the existing architecture whether it's gas or plant condition monitoring.

The safety aspect too cannot be underestimated. Whereas once a sensing system would have been needed to be housed in a large and heavy explosion proof housing, the small overall size of the new development means that it is easier to design housings suitable for applications in hazardous areas and with improved levels of ingress protection, an extremely important criteria in harsh industrial environments. Intrinsic functional security is also considerably improved as the sensing system is engineered as an integrated whole. This eliminates the risk of invalid or unsafe equipment combinations that can occur in a piece-meal system.

Across every sector of industry in the UK and across Europe the benefits of this new Sentro 8 system will rapidly become apparent with a corresponding positive impact on manpower levels and operating procedures. Installation and operating costs can also be reduced as a result of this new technological concept.



Figure 5: Many different industries are set to benefit from the Sentro 8 system from Trolex, a completely new concept in environmental monitoring, gas detection and machine condition monitoring.

### About the author

Mark Rowland, Engineering Manager at Trolex Ltd., has 20 years' experience in environmental monitoring systems.