



# A neat solution

## Autarchic measurement system with no laptop requirement

**PC based systems are usually required for large scale measurement data acquisition. Such systems, however, are not ideally suited for mobile data acquisition because of their susceptibility to failure. Independent modular solutions are relatively expensive due to the many components required. Twin-Tec required a precise, reliable and flexible system for recording measurements during test drives. An IEE journalist visited Twin-Tec to find out why they chose a Delphin system.**

Twin Tec supply a wide range of diesel particulate filters for refitting into existing vehicles. The company need to continually develop new products to offer filters to as many vehicle owners as possible. The problem here is that virtually every new filter requires a new design because of the variety of exhaust systems and their varying temperature and pressure operating levels. "Despite the experience we have we still have to carry out a series of test drives at varying operational profiles to ascertain whether the filters meet the required standards", said Peter von Pigage, head of Twin Tec's measurement technology department.

During test drives exact route, speed and idling times need to be maintained. As well as filter temperature, and filter pressure, engine rotation, vehicle position and speed also need to be measured accurately and reliably.

### PC and modular based systems rejected

A PC based measurement system is too unreliable for such a task due to its hard disk and temperature sensitivities. Twin Tec have therefore been using a modular system whereby channels can be adapted to specific tasks through a variety of components. This solution, however, is not without its problems. "Because we needed a lot of modules for measuring, the system became really expensive. Configuration was also difficult and we needed a laptop for recording measurement data. Because recording couldn't take place with chronological synchronism a lot more work was required when analyzing the data", were the reasons given by von Pigage for the need for a replacement system. At the Testing Expo he then discovered the TopMessage devices from Delphin Technology. The compact and practical devices operate independent and do not require any amplifiers thanks to their electrical isolation. Each of the up to 30 analog inputs can be used for RTD, thermocouple, volt or 20 mA signals.

### The trick using GPS

Von Pigage reported that a positive partnership began developing right from the start: "Delphin gave us devices which we could test right down to their bare bones. They also designed a solution for us using an external converter for the acquisition of engine rotations as well as the capability to measure speed without having to interfere with the on-board electronics". With the right equipment the solution to Twin Tec's problem was easy. Dietmar Schneider, Delphin's Sales Manager, said, "We just attached a GPS receiver to the data logger's serial port and wrote the appropriate driver. In this way we get the position, speed and route driven in one go." All values are measured and stored with chronological synchronism. A high resolution is also no problem. Von Pigage explained that "with some measurements I record several measurements within a second to get an average. This eliminates any outliers in the measurement data".

### Flexibility is the key

Within just a few weeks Twin-Tec were supplied with a new, flexible and easy to use measurement system. Five TopMessage devices are now being used. As well as analog inputs for temperature and pressure sensors, the data loggers are also equipped with a digital module for rotation acquisition and a driver for the GPS receivers. The 256 MB storage capability provides enough space for measurement data from several thousand kilometers of test drives. The measurement system is easy to install and reinstall – an important factor when taking measurements from many different vehicles. Because the authorities have not yet set any exact technical regulations, limit

**Delphin Technology AG**

Sülzetalstrasse 23 • 51491 Overath / Germany • Phone: 0049 (0) 2207 9645-0 • Fax: 0049 (0) 02207 9645-35  
info@delphin.de • www.delphin.com



values can change, "Therefore, any measurement system needs to be able to adapt", pointed out von Pigage. "In modular systems, the complex software usually means training courses are required to be able to configure the channels. The TopMessage virtual channels makes channel configuration really easy". Functions which can be simply set up include communication protocols (GPS), connecting external components (rotation detection via on-board power supply voltage) as well as calculation channels, linearization channels, set point channels, PID controller channels and timer channels.

### **Configuration and analysis with just a few clicks**

Virtual channels enable an online analysis to take place during the trial without the need for any PC support. For example, the driver can be provided with information on whether the required speed is being maintained or whether engine idling times have been adequate.

The ProfiSignal software can project measurement data allowing the data to be evaluated. The "Klicks" version improves documentation by generating protocols with all relevant data. Creating new testing, trial or processing systems is made easy by the function blocks available. They can be configured visually with no need for any programming. Program instructions are generated by selection using the mouse. Any number of tasks can be configured into projects and applications using ProfiSignal Klicks so that company-wide systems can be organized and managed. Projects provide an overview of current applications in the various departments. Specific process visualization diagrams can be created at just a few clicks enabling observation and operation.

#### **Summary**

The industrial grade, independent TopMessage devices, with their flexible virtual channels, can be used for any measuring requirement. Recording at 24 bit resolution can be made with up to 30 analog channels with no requirement for transducers or amplifiers. The devices can be extended using a range of modules. The ProfiSignal software and its variants Basic, Klicks and CMS, enables the easy generation and analysis of testing, trial and processing systems. Instead of laborious programming to meet measurement requirements, just a few mouse clicks are necessary.

#### **The Company**

Twin-Tec develops emission reducing components for fitting into existing vehicles. As well as the diesel particulate filter Twin-Tec also supply cold start controllers. These can be used to reduce emissions in vehicles with catalytic converters from Euro 1 to Euro 2 or D3. They are mechanical devices and can be installed without having to interfere with the vehicle's electronics. Twin-Tec can also supply a range of catalytic converters as well as exhaust manifolds and weak-mix systems.

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