

## The latest by email

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## QUAD I

## Expansion of Services

In response to ever increasing customer requests for services associated with the supply of sensors and instrumentation, we have introduced a sister company to Techni Measure! Quad I, representing **Intelligence, Insight, Innovation & Integration** offers four main services:

**Measurement System Hire** – we have a growing range of sensors and instrumentation offered on a rental basis

**Sensor Installation Service** – expertise in strain gauging and other sensor types either at a client specified test location or in our own laboratory

**Test Data Measurement Service** – let us do the hard work! We will install sensors, configure data acquisition and record measurements

## Happy retirement!

After 38 years of leading Techni Measure since joining his father Frank Ramage in 1980, Ian Ramage has taken the opportunity to retire from the day to day running of Techni Measure, leaving the management of the company in the hands of his son Andrew Ramage and son-in-law Steve Brown.

Both have been with him since the beginning of 2015 when the old Techni Measure partnership became Techni Measure Ltd. Ian and his wife Felicity



during your test campaign, delivering you raw or processed data in your desired format

**Measurement System Development, Assembly and Integration** – we can design, assemble and integrate complete bespoke measurement systems into your test or inspection processes

We have been rapidly growing the resources of Quad I since March 2018 and have already successfully delivered a number of projects for clients. The new company is currently co-located at the same addresses with Techni Measure in Doncaster and Bristol.

Since a sibling is not possible without a parent, we have structured the two companies within holding company Quad Technology Group Ltd. If you have a measurement requirement then between Techni Measure and Quad I we will get you a solution! [www.wearequadi.com](http://www.wearequadi.com)

now fill their time with a wide range of activities including dinghy sailing, travelling in their campervan, DIY blacksmithing, new puppy Tilly and their seven (soon to be eight) grandchildren; and we do still have Ian available to us on a part-time consultant basis so as to draw on his vast experience and expertise in sensors and measurement systems. Ian would like to wish all of his customers and industry contacts the very best for the future and we will be happy to pass on any messages.

## This Issue

New Services **P.1**

200 C Accelerometer **P.2**

Mobile Accelerometer Calibrator **P.2**

OEM Wireless Nodes **P.3**

Combo Thermocouple Fitting **P.3**

Rental Stock **P.3**

Accelerometer Mounting **P.4**

## Who's Who

We are very pleased to welcome Ashish Thapa to our growing team. Ash has a degree in Aerospace Engineering and his role with us as a Project Engineer has him performing bespoke measurement system design and assembly as well as sensor installation and data measurement work.

Ash is primarily based in our Doncaster office and can easily work from our Bristol office or on-site at customer locations throughout the country when required.



## 200°C IEPE Accelerometer

Dytran Instruments have recently introduced their first IEPE type accelerometer capable of being used up to 200 degrees Celsius. This model 3525A3 is among the world's first quartz accelerometers to operate at 200°C continuously with internal electronics. Typically, measurements at this temperature require a charge mode sensor with an in-line IEPE charge amplifier, but this new design eliminates the need for the in-line amplifier, thus reducing cost and complexity.

The 3525A3 utilises an inverted quartz element to minimise the

unwanted effects of base strain on the accelerometer signal, with quartz providing long term thermal stability and a low thermal coefficient of sensitivity, so the sensor changes very little in sensitivity from room temperature to 200°C. With a 10mV/g sensitivity (500g range), this sensor comes in a hermetically sealed stainless-steel housing with an industry standard 10-32 coaxial connector and a 10-32 integral mounting stud. The sensor has a frequency range of 5 to 10,000 Hz, is about 17mm high and 10mm



diameter and weighs just 6.8 grams. The small size makes it ideal for use in locations inaccessible to larger high temperature accelerometers.

Typical applications would include downhole vibration and shock measurements, environmental test chambers, automobile applications including engine and exhaust hot zones, and any general-purpose high temperature vibration application. Please ask for detailed specifications for this new 3525A3 accelerometer and look out for more new designs benefiting from the high temperature electronics.

## Mobile Accelerometer Calibrator

The new CV-10 mobile calibrator, designed and built by Spektra, consists of a complete accelerometer calibration and test system installed in a rugged waterproof case.

It can be used for quick, on-site checks of accelerometer or vibration meter performance either by manually setting frequency and amplitude or by running pre-set automated calibration routines. The integrated vibration exciter has an internal reference accelerometer as standard, or as an option it can use an external reference accelerometer, and the system is supplied with a full DAkkS accredited calibration certificate. Accelerometers up to 900g can be tested and are easily mounted to the armature via a 1/4-28 female



thread; two open end wrenches and a range of thread adapters and adhesive mounting plates are supplied. The system is fully portable and powered by an integral battery, with an external mains PSU that fits in a recess within the box for recharging or mains operation. Cables or other accessories can also be stowed in this recess. There are four adjustable feet on the underside of the case, which can balance the calibrator to a maximum 2° slope.

The vibration exciter can generate up to 20N of force, allowing a sensor payload of up to 0.9kg, with acceleration amplitudes of up to 20g (200 m/s<sup>2</sup>) and a frequency range

of 5Hz to 10kHz. The system has built in signal conditioning for direct interface with IEPE, Charge mode, direct voltage and current output sensors as well as an extension port allowing other interfaces including an optional piezoresistive (bridge type) interface. The measurement results are displayed on the integrated display and stored in internal memory, the data transfer is performed via the supplied USB memory stick as standard or and optional ethernet connector is available for direct connection to PC. Software is supplied for setting configuration parameters and generating automated calibration sequences.

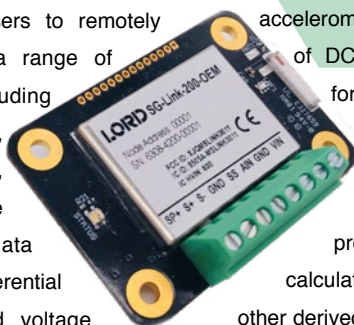
Please ask for further details, or if you are interested in a demonstration of this new mobile vibration calibrator system.





## New OEM Wireless Nodes

The new LORD Sensing OEM wireless nodes include strain gauge, temperature and accelerometer nodes. These nodes are supplied as PCBs, designed to be integrated into sensors or systems to enable wireless connectivity. The SG-Link-200-OEM allows users to remotely collect data from a range of sensor types, including strain gauges, pressure transducers, and load cells. The node supports data collection from 1 differential and 1 single-ended voltage input channels at sample rates up to 1 kHz. It also has a third digital pulse input for sensing RPM.



The TC-Link-200-OEM allows users to collect data from a range of sensor types including Thermocouples, Resistance Thermometers, and Thermistors. The node supports 1 temperature transducer at sample rates up to 128 Hz. The G-Link-200-OEM has an on-board triaxial accelerometer with a bandwidth of DC to 1kHz, is available for configuration from  $\pm 2g$  to  $\pm 40g$  range and offers sample rates up to 4kHz. On board processing can be used to calculate and output RMS and other derived parameters.

All these sensors have high resolution and low noise signal conditioning in a very small package size of about 29

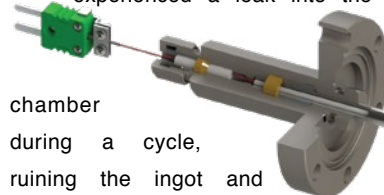
x 40 x 6mm and require an external 3.3 to 30VDC supply. They are offered with the option of either an on-board chip antenna or an external antenna connector. The LXRS protocol allows lossless data collection, scalable networks and node synchronization of  $\pm 50 \mu\text{sec}$ . Users can easily programme nodes for continuous, periodic burst, or event-triggered sampling with the freely downloadable SensorConnect software, and easy custom integration is possible with the open-source, comprehensive MSCL communication and command library. The web-based SensorCloud interface may be used to optimise data aggregation, analysis, presentation, and alerts for sensor data from remote networks.

## Combo Thermocouple Fitting

Conax Technologies have introduced a thermocouple design that has both a standard compression seal for the thermocouple sheath and a secondary seal for the output wires. The dual seals ensure that if the thermocouple sheath breaks or wears out, there will still be no leak into or out of the process. In-process leaks under vacuum or under pressure can be costly in terms of lost time, materials and finished product. Under certain circumstances, they can also be extremely dangerous, so when customers asked Conax for a solution that would eliminate the risk of in-process leaks caused by sheath failures, they devised the idea for a combo fitting.

For vacuum applications, these dual fittings are ideal for processes that take many days to complete, utilize expensive raw materials, or when it would be especially costly to lose the finished product due to a leak into the process. For example, a solar manufacturer with a 20-day poly-crystalline ingot growth cycle, experienced a leak into the

chamber during a cycle, ruining the ingot and costing the customer time and money. The Conax combo fittings eliminate this possibility. Leaks out of a pressurised chamber can be even more serious for



processes containing dangerous chemicals. For example, a Conax customer was running a process to dispose of old chemical weapons during which the bomb would be sealed in a chamber, detonated and the atmospheric temperature inside the chamber raised to destroy the chemical contaminates. The Conax combo fitting ensures that no lethal gas would leak from the chamber during the disposal process, even if damage to the thermocouple occurs.

Conax can customise a combo fitting to your unique requirements using any two of their standard fittings. Talk to us to find out if a Conax combo fitting is right for your process.

## Rental Stock

Do you need a sensor quickly for a short term test?

As mentioned in our cover article, our new company Quad I is offering rental of sensors and systems. We are building our stock of rental equipment and have started with various accelerometers, strain gauge datalogger and wireless instrumentation equipment including products from Dytran Instruments, LORD Sensing and TML. Standard pricing is on a weekly basis; or a daily basis if loaned as part of a data measurement service.

We would welcome your feedback and any suggestions on what items we should include in our rental stock that will benefit your projects.

The latest edition of our product guide is now available in both print and PDF format. Recent changes include our offerings now organised by measurement parameter and technology to assist with selection of the correct items. For more details and to request your copy please contact us.



## Techni Measure On Show

We continue to exhibit at various shows across the country. We have a large selection of our current products along with live demonstrations available on our stand. Our team always welcome the opportunity to meet new and existing customers to discuss any products or applications where we may be able to assist. For information on which shows we will be attending please see the Exhibitions page on our website located in the 'About' section.

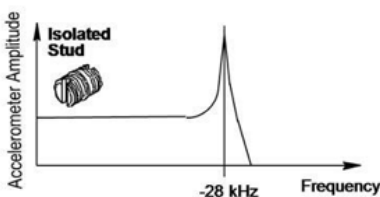


## TechNote: Accelerometer Mounting

When measuring vibration using an accelerometer it is important that the transfer of motion from the test article to the sensor is optimised, especially when testing at higher frequencies. Since various mounting methods may adversely affect accuracy, it is important to understand the mechanics of mounting the accelerometer for best results.

A typical accelerometer response graph would show that the lower frequency portion of the curve is sufficiently flat to provide a useable range up to approximately 1/3 of the internal resonant frequency. This will not be the case however, if during the mounting, other "springs" are interposed between mating surfaces creating secondary spring-mass systems with lower natural frequencies than that of the accelerometer itself, usually referred to as the mounted frequency. Here is a description of the four most common accelerometer mounting methods:

### Stud Mount



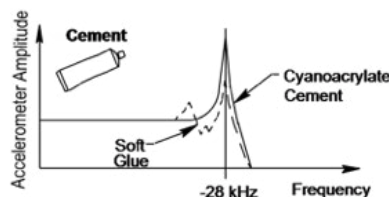
An accelerometer "stud" may be integral, i.e. machined as part of the accelerometer case, or it may be separate (removable). The stud mount yields the best results because the accelerometer and the test surface are held in very tight contact due to the high clamping force of the stud, ensuring the best transfer of motion. Of the two stud mount designs, the separate stud is the most popular for several reasons:

1. The removable stud allows easy access to the mounting surface of the accelerometer for restoration of surface flatness should this become necessary. When the stud is integral and cannot be removed, refurbishment of the mounting surface becomes very difficult.
2. If the integral stud is broken or the threads become stripped or otherwise damaged, the sensor is no longer of any use, whereas a separate stud can be easily replaced.
3. The separate stud type accelerometer may also be directly

adhesive mounted should this be preferred, without using a mounting adapter.

Many mounting studs are fabricated from heat treated beryllium copper because of its high tensile strength and its low modulus of elasticity. This means that the stud will be very strong and relatively elastic, a perfect combination for the task of holding two surfaces together under a high preload. The flatness of mating surfaces in the mounting of piezoelectric accelerometers, especially regarding frequency response, is very important. Accelerometers should be manufactured to very tight tolerances, but the test object surface must be carefully prepared as well. The surfaces should be carefully cleaned and then a thin layer of silicone grease may be used to ensure the best interface and maximise transmissibility of high frequencies to the accelerometer. It is also very important to ensure that the mounting torque of the accelerometer is set to the value specified in the user manual using an accurate torque wrench.

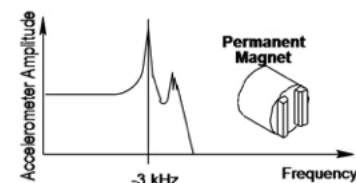
### Adhesive Mount



Situations often arise where the stud mount method is impractical, such as when mounting the accelerometer to thin sheet metal or to other surfaces where drilling a mounting hole is not allowed. In such cases, an adhesive mount installation can be the only practical way to install an accelerometer. Some accelerometers are designed to be adhesive mounted directly to the test surface, whilst others use mounting adapters or bases for adhesive mounting. These adapters are normally first glued to the test surface, then the accelerometers are stud mounted to them. The problem with adhesive is that the thicker it is the more effect it will have in reducing the usable frequency. The use of a cyanoacrylate adhesive is usually recommended because they set very quickly, not much adhesive is required for a strong bond, so glue lines will necessarily be very

thin, and clean-up is easy because these types of adhesives are easily dissolved with acetone. Other types of adhesive would be recommended for high temperature or humidity test conditions.

### Magnetic Mount

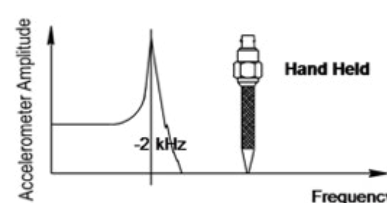


Magnetic mounting adapters are used to attach accelerometers to ferromagnetic surfaces such as machinery and structures where the accelerometer is to be moved quickly from place to place. The accelerometer is attached to the magnetic adapter (usually by stud mount) and the assembly is applied to the test surface. While this method is certainly convenient, magnetic adapters should be used with caution and rarely trusted at frequencies higher than 1 kHz.

### Wax Mount

Mounting wax is very convenient to use but should only be employed if testing is only at low frequencies and the accelerometer is not too heavy. The inconsistency in thickness and the low modulus (rigidity) of wax make the results unreliable at higher frequencies.

### Hand Held



Hand held probes where the accelerometer is mounted onto the end of a "spike" and held against the test surface by hand force are extremely convenient for quick checks of vibration amplitude and low frequency content, however this method should not be used where accuracy or repeatability is important or for measuring frequency content greater than a few hundred Hz.

Please ask for advice if you are unsure about which is the most appropriate mounting technique for your particular application.



Measurement and control systems for industrial and research applications