

# Getting the measure of it

**A small UK company with a long history but a low profile is a top-three company worldwide in the machine tool field. But it has other markets in its sights as well. Andrew Allcock explains**

**A** low-profile company, Leicester-based Newall Measurement Systems is one of the top three companies of its type in the world, ranking alongside Heidenhain and Fagor (if China is excluded) in encoder/DRO manufacture. The 70-employee company (plus 14 in the US) makes in excess of 50,000 products in a year, the vast majority being exported. Indeed, the firm won a Queen's Award for Export in 1998.

With a history that stretches back to 1968 (see box, page 82), the company pioneered the then unique Spherosyn measurement technology in 1973 – a system based on the use of plated nickel-chrome elements inside a stainless steel tube and the varying inductance this arrangement creates which can be measured and converted to length.

Today, the company has some imitators – the original patent has expired – but, as managing director Derek Rimmer emphasises, they can't compete on quality and accuracy,

*DROs and encoders – Newall Measurement Systems' stock in trade sees it a world leader*

because they don't know the secret of the system. That secret is to be found in the company's element grading machine – grading for what, Mr Rimmer does not reveal, of course.

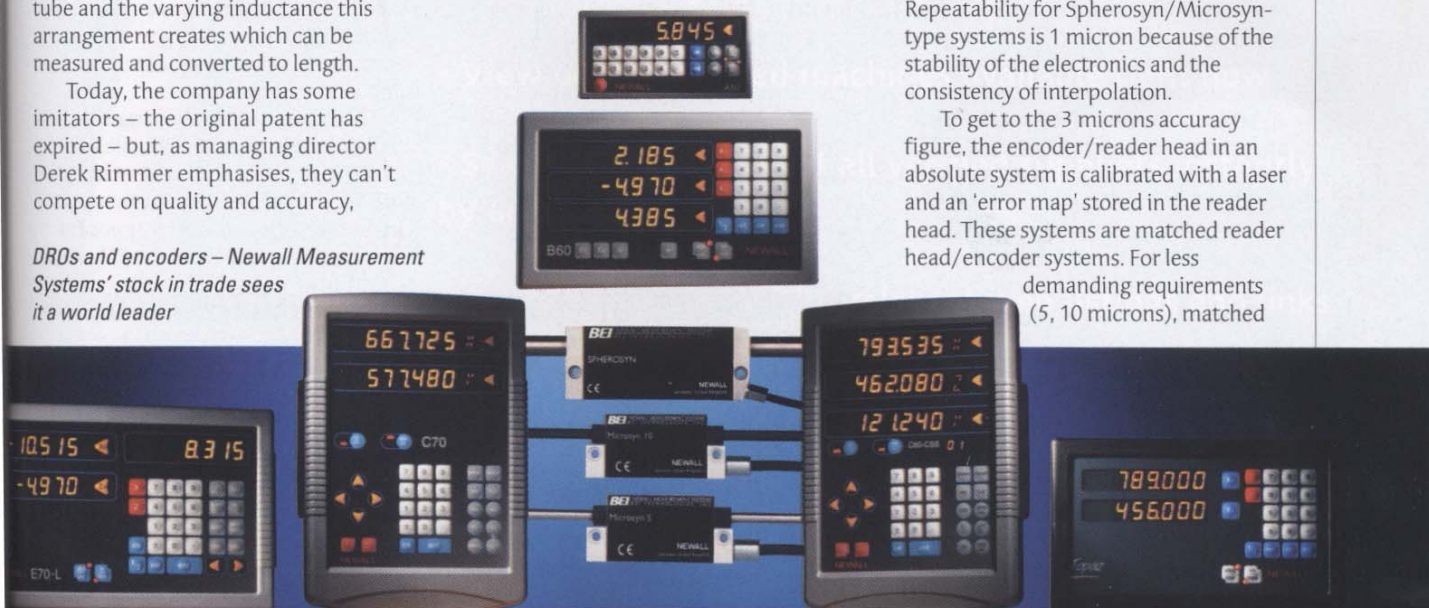
In terms of technology development, the original analogue 1/2 inch ball Spherosyn incremental range was supplemented by the Microsyn 5 mm diameter ball system in the late-1990s – useful in areas where space is restricted.

Digital technology was introduced in 1999 with the SHG (1/2 inch) and MHG (5 mm system – utilising a stainless steel or carbon fibre tube) ranges. And absolute measurement technology was

developed in 2002 on the SHG product for which the company has been granted worldwide patents. In 2004, Newall won approval for its Fagor CNC serial interface, and at last year's EMO show, the company introduced the MCG reader head – used with the MHG tube. This smaller reader head is for applications where space is highly restricted, in 5-axis spindle heads, for example. And its very latest product is its SPB encoder, for applications on press brakes.

Spherosyn/Microsyn-type systems have a resolution as low as 0.1 micron and accuracies per metre of 3, 5 or 10 microns, while for its magnetic tape system accuracy is 25 microns/m. Repeatability for Spherosyn/Microsyn-type systems is 1 micron because of the stability of the electronics and the consistency of interpolation.

To get to the 3 microns accuracy figure, the encoder/reader head in an absolute system is calibrated with a laser and an 'error map' stored in the reader head. These systems are matched reader head/encoder systems. For less demanding requirements (5, 10 microns), matched



perfectly positioned



*Derek Rimmer – imitators do not know the Newall secret and so can't deliver equivalent systems*

reader heads are not required and this allows any reader head to operate with any encoder, offering easy in-the-field replacement of only one item.

The strength of the company's totally sealed Spherosyn/Microsyn technology was and remains ruggedness. The company admits that glass scales can achieve finer resolution measurement and hence accuracy, (sub 1 micron), but their resistance to shock and coolant ingress is lower, while degradation of the glass clarity is an issue they face, along with condensation in hot, humid countries in South East Asia, for example. "There is a big market in servicing machine tools, partly because of changes in the glass scale condition," says technical director Dr Mark Hudman.

Another benefit is that in terms of thermal growth, the Newall systems are similar to the substrate to which they are

connected, unlike glass which has a lower co-efficient of thermal expansion than cast iron, for example. And rapid traverse rates of up to 30 m/sec can be supported, while acceleration of in excess of 600 G has been realised in thixotropic moulding machines.

#### RUGGED RELIABILITY

This ruggedness is something that is important to companies large and small that opt for replacement of the original glass scales when problems occur. Take Getrag-Ford's Halewood plant which was experiencing problems with the glass scales on an elderly Emag USC slantbed lathe. The problems were due to contamination and reader head alignment difficulties leading to a glass scale failure every two months.

The retrofitting of the Newall SHG scale was undertaken by WYKO, which provides on-site services for Getrag-Ford, and after 12 months the encoder had performed without fault. In fact, such has been the success of the project that other opportunities for retrofits are in the pipeline at Getrag-Ford – again replacing glass scale technology with a history of failures.

"The project has passed off extremely well," confirms WYKO's John Kay. "If the original glass scales had still been on the machine, I am confident we would have witnessed it being changed six times in the past 12 months. Yet with the SHG there have been no problems whatsoever. We are now actively

encouraging our customers to look at Newall encoder technology as the reliability is simply superior."

It was system reliability that Newall's managing director says underpinned its increased market share when other sectors declined in recent years. People only spent money on critical areas, and reliability of machines was just such an area. "In 90 per cent of cases it is possible to swap Newall's encoders for glass scales," Mr Rimmer offers.

The digital, closed-loop, absolute encoder market – which includes retrofits for CNC machine tools plus the supply of encoders to machine tool builders – is the growth market, but its original manual machine, open-loop, incremental encoder/DRO activities are far from shrinking. "It is still a growth market," Mr Rimmer advises. Some Chinese manufacturers produce 20,000 manual machine tools a year and many of these are fitted with DRO systems either at source or by importing agents around the world. China is also a market where Newall faces imitators, of course. They not only give their products similar names, but have even copied Newall's website, he adds. The company is fighting back by producing technical reports on the inferior products and supplies these to its dealers.

For the year 2005, China represented 19 per cent of the company's sales, putting it above the UK home market with 14 per cent. The US is by far the largest market where over 50 per cent of

#### Newall's history in brief

Newall Measurement Systems began life inside the B Elliott group of companies in the late 1970s and that is where it stayed even as the group's other machine tool activities were sold or disappeared. In 2004, it was acquired by US-based BEI but just one year later BEI ([www.bei-tech.com](http://www.bei-tech.com)) was itself acquired by French company Schneider Electric ([www.schneider-electric.com](http://www.schneider-electric.com)). Schneider Electric is present in 130 countries and has a turnover of €11.7 billion. Newall Measurement Systems sells through a network of agents/distributors for the most part, in over 63 countries. The BEI/Schneider operations in various countries offer the potential for additional routes to market into different sectors.



Machine tools have been a heartland but Newall is eyeing the big \$300 million linear displacement market of the US

sales were taken during the year.

The company has a product development strategy, although it is not willing to share much of this in detail. But in the area of CNC machine tools, Newall is working on systems with much higher resolution and, hence, better accuracy, it reveals.

However, growth is not just seen in the machine tool field, which has been the heartland for the company over several years, but in other areas including automation machinery, aerospace, medical, food and beverage, pharmaceutical, packaging, printing, automotive, hydraulics and other industries – and while absolute technology is key, there remains a place for incremental in these areas, too. And it is the US market with its \$300 million market for linear displacement devices that is particularly targeted.

Mr Rimmer acknowledges that for such a small company it will be challenging to open up this new opportunity, but cites the very qualities that make it successful in the machine tool arena as those that will gain it market share in its new fields of activity – providing solutions to customer problems; competitive pricing; accuracy and dynamic performance.

And the fact that Newall now belongs to BEI which owns other companies that already have a connection to these new markets, and BEI is itself owned by Schneider Electric (see page 82), will be a help, he offers. So Newall Measurement Systems may be small, but it has very large friends to help it succeed.

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### HEIDENHAIN

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## HEIDENHAIN Dynamic Collision Monitoring protects complex machines

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