

Keith Wilson MIET

Production has recently ceased of the very last model of analogue AVO meters. This was a true British icon that could trace its roots directly to one of the twentieth century's most significant breakthroughs in instrument technology.

Keith Wilson tells the story.

THE END FOR THE AVOMETER

If you were an electrical engineer working in the UK in the decades from the 1950s to 1980s, there was one thing you coveted more than anything else – your own Model 8 AVO meter. In that era, just about anything else was just a pale imitation, a toy trying to do the job of a professional tool.



Megger.

The AVO 8 MkV was described as ideal for testing electronic equipment.

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What most people probably didn't realise, however, was that until June 2008, you could still buy a brand new AVO 8 provided that you had around £600 to spare. You would have had to order it from Megger, however, as AVO International changed its name to Megger in 2003 because the Megger brand is much better known outside the UK than the name AVO.

In spite of the change of name, the instrument would still have been built at the factory in Dover where every AVO multimeter has been manufactured since 1962. And it would still have had the name AVO moulded into its front panel.

In fact, the demand for the AVO 8 was, at the time production ceased, still steady at between two and three hundred instruments a year. Megger would have been happy to continue with production, but for two insurmountable problems.

The first was that it was no longer possible to source the components needed to build the meters, nor were acceptable substitutes available. That's probably not too surprising, for a design that has altered comparatively little since 1972! The second was the highly skilled technicians who assembled the movements were becoming almost impossible to replace as older staff retired. Regrettably, these technicians are a dying breed.

It seems probable that the AVO 8 was the last professional analogue multimeter in production anywhere in the world. If that is the case, then it's very fitting, as the original AVO meter was undoubtedly the world's first professional multimeter!

The first AVO was born out of the dissatisfaction of Post Office engineer Donald Macadie with having to carry many separate instruments with him as he went about his daily work. It occurred to him that he could ease this problem by integrating the functions of several instruments into one.

Macadie took his idea to the Automatic Coil Winder and Electrical Equipment Company, where it was translated into reality. The first AVO – so named because it could measure Amps, Volts and Ohms – was put on sale in 1923. This was a DC-only instrument, but it's a tribute to the foresight of its designers that many of its features remained unaltered right through to the last Model 8.

These include, for example, the high-quality damped moving coil movement, the kidney shaped window, the knife-edge pointer with anti-parallax mirror, the twin rotary switches for range selection and the exceptionally robust construction.

From this point on, the AVO meter went through many developments. In 1933, for example, the Universal model was introduced that added AC measurement capabilities, while 1936 saw the introduction of the Model 7 with its exceptional – for the time – 1,000 ohm per volt DC sensitivity. The Model 7 incorporated not only a fuse, but also a new form of overload trip designed to protect the instrument if the pointer banged against the end stop of the scale.

Other successors included the Model 40, which was, in many ways similar to the Model 7 and was designed to be particularly useful for working on three-phase systems and other power-related tasks. There were even Braille versions for blind users! It's very tempting to wonder how compatible these would be with modern health and safety legislation.

One of the biggest developments came in 1952 with the launch of the very first AVO Model 8. Designed to meet the needs of the rapidly expanding electronics industry, this offered a sensitivity of 20,000 ohms per volt on DC ranges – a figure previously unheard of outside the laboratory. At last it made possible meaningful readings on the high impedance circuits that are so common in electronic apparatus.

The Model 8 did not, however, supersede all of the earlier models. The Model 7 and the Model 40, for example, remained in production for some considerable time, as they were well suited to tasks outside the electronics sector.

The Model 8 was exceptionally successful and played a big role in allowing AVO, as it was by then known, to deliver its millionth multimeter in 1966. As the 1970s approached, however, it was time to move forward and October 1972 saw the launch, with much fanfare, of the AVO Model 8 Mk V. Outwardly very similar to the early versions of the Model 8, internally this was a completely different instrument.

It had a new centre-pole movement that was designed to be robust and inherently self-shielding. It also had a shorter pointer but, because the angle of deflection was increased, the scale length remained the same as the previous versions.

The really big change, however, was the replacement of the previously hand-wired components with printed circuit boards. In fact, many of the instrument's shunts were actually part of the printed circuit, a technique that contributed to accuracy, stability and ability to withstand overloads.

An improved cut out was also featured, which AVO had subjected to life tests of 100,000 operations – equivalent to ten overloads per day for 30 years – without loss of performance.

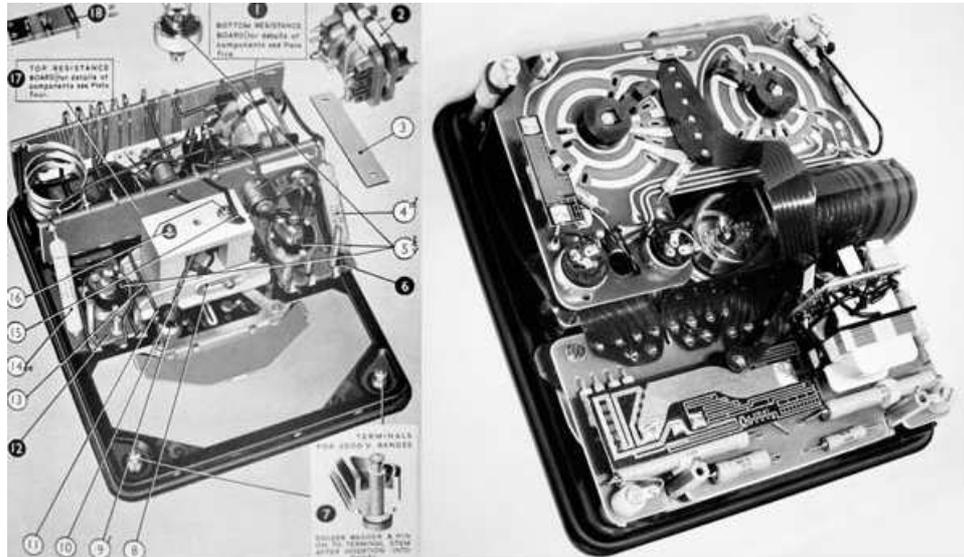
A price comparison is instructive. When it was launched in 1952, the first AVO 8 had a list price of £16. At its introduction, 20 years later, the AVO 8 Mk V sold for £37.70.

Fast forward another 36 years and the price was £550. That's hardly a fair comparison, however, as by then the AVO 8 had moved well out of the mainstream and was without doubt a speciality product.

At its launch, big claims were made about the excellence of both the design and construction of the AVO Model 8 Mk V. It has to be said that these claims were fully justified, as the instrument remained in demand and in production, with very little in the way of modifications, for 36 years, a feat that almost no other electrical or electronic product of similar complexity can match.

The end of production of the AVO Model 8 is certainly a notable event from a historical point of view, but it should, perhaps, be viewed in the same context as the manufacture of the last steam locomotive. The end of an era certainly, but also old technology that has served us well making way for something more modern, more reliable and more effective.

And that something, of course, is digital technology. Older engineers – and I am one of them – do, of course, miss the pointer swinging across the scale. The engineers at Megger have, however,



Megger.

Though similar externally, the AVO 8 MkV and its predecessors could hardly have been more different internally.

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addressed even this in the digital successors to the AVO meter. They have included a digitally generated arc display with characteristics that closely match those of an analogue pointer.

Which means that, by switching to digital technology, at least with the Megger range, there's nothing to lose. But there is much to gain, not least higher sensitivity, more functions, auto-ranging, ease of reading and, of course, much better value for money. As in so many areas of technology, there can, therefore, be no other conclusion than that digital is the clear winner over analogue.

Footnote

If you really want an AVO 8 and you left it too late to order a new one from Megger, take a look on eBay. There are usually a few examples available at reasonable prices. And, of course, Megger will be offering calibration services and non-movement repairs on the Mk VII models, the most recent successors to the Mk V, for years to come.

Acknowledgements

The author would like to thank Mark Johnson of Megger and Asha Marvin of the IET Archive Department for their assistance in making available material for this article.

About the author

Keith Wilson joined the IET in 1968, and spent the first 20 years of his professional life working as a design and commissioning engineer on industrial control systems. During this period, he used his trusted AVO Model 8 extensively. He subsequently succumbed to the lure of a marketing role and has lately become technical consultant to Fresh Public Relations, the company that provides marketing and public relations services to Megger and many other electro-technical businesses.