



Metalworking

Digital Takes on Dial in War of the Gauges

Kip Hanson | Nov 05, 2024

Digital measuring instruments are nothing new: Mitutoyo introduced its first digital micrometer to the Japanese market in 1979. Swiss metrology firm TESA began producing digital electronic calipers the following year.

And as George Schuetz, director of precision gauges at Mahr Inc., notes in his **2023 article** *"Dial Versus Digital Indicators, 40 Years Later,"* the first digital indicators hit the market in the early '80s.

People expected the newfangled measurement gadgets to "blow mechanical dial indicators out of the water," he says. They didn't, at least not right away. Like the transition from vernier scales to dials, digital metrology tools have traveled a long, slow road to market acceptance.

Whether they will become the preferred (and possibly only) offering in the years to come is anyone's guess, although as Schuetz explains, "digital finally seems to be gaining the upper hand."

The Argument for Digital

He provides several arguments for this conclusion. For starters, today's digital indicators not only provide extremely high resolution but users can also switch between resolutions with the push of a button. Not so with a mechanical device.

They're also more user-friendly than ever before, able to display out-of-tolerance conditions and actual part size rather than the basic deviation from zero that users have come to expect from dial indicators.

And since the digital indicator has no dial, there's no chance that an inattentive operator fails to notice an extra rotation of it, thereby scrapping out a batch of parts.

Perhaps most important to the buying public? Price. Though still significantly more expensive than their analog equivalents, the price of these high-tech measurement tools has come down as their popularity grows. The higher cost brings far greater functionality, too, including the fact that a single digital indicator can take the place of several dial-powered devices.

Making the Switch to Digital Gauges

As noted, changing from 0.0005 to 0.0001 to 0.00005 resolution takes a push of a button. So does switching between inch and metric, absolute or incremental, or wirelessly sending data to a printer, external display or a computer running Excel or *statistical process control (SPC) software*.

And for shops attempting to implement lights-out, *fully automated operation*, some digital indicators can signal a machine control to make dimensional adjustments or tell a robot to stop the process. None of that is possible with an analog indicator.

Further, digital indicators are highly programmable. Patrick Sullivan, strategic distribution sales specialist at Mitutoyo America Corp., explains that these “smart tools” can alert the user *when the tool needs calibration*.

Depending on the model, the customer can set tolerances so that the gauge lights up green for good parts or red for bad (as with the company’s IDF series) or use programmable arrows like those found on *Mitutoyo’s IDC* line to indicate whether parts are in tolerance.

“We worked with an oil and gas company recently that not only wanted to transmit the measurements to their data collection system but also wanted to send the calibration date,” he says. “But you can include all kinds of other information, such as the operator’s name and the part number they’re checking. Whatever you need to meet your compliance requirements, we can probably accommodate it with one of our digital products.”

With the wide array of benefits, why do Mitutoyo, Mahr, Starrett and other metrology equipment providers continue to make and sell dial indicators?

Some of the market’s digital resistance is due to the higher price point, Sullivan says, although the primary reason is often simpler and, to a certain extent, generational: Much of today’s workforce prefers dial indicators because A) that’s what they’re used to and B) they like seeing the needle move.

Even here, though, digital has the upper hand—some models can emulate a dial indicator’s sweeping hand movement and show users the high measurement, the low measurement, and every measurement in between. “It’s the best of both worlds,” Sullivan adds.

Mandatory Data Collection

“It’s understandable that people want to continue using what they’re comfortable with,” says James Clinton, inside sales manager at The L.S. Starrett Company. “Even so, many are willing to shift when it’s not a giant leap, while others are sometimes forced to adopt new technologies. That’s often the case when data collection becomes mandatory, as we’re seeing more and more often in the aerospace and medical sectors.”

Young workers, meanwhile, are “all over digital,” Clinton adds, and far more likely to prefer such devices to analog equipment.

Mike Ingman, Starrett’s director of research and development, understands digital’s popularity among Generation Z and millennials, many of whom were born around the same time that Starrett and others introduced digital measuring tools.

Depending on the application, he says, it might be necessary to “split the difference” when reading a dial indicator. By contrast, digital devices typically display only numbers, rounding up or down to the next whole number. Ingman reiterates the argument made earlier—simply change the resolution—then points to *Starrett’s W4900* indicator as a best-of-both-worlds solution.

"Everybody loves that needle, which is why our president and CEO Doug Starrett asked us many years ago to develop a digital indicator that can also have an analog display," Ingman says. "We were thrilled to bring this to fruition this past July with the W4900 touchscreen indicator. It not only joins our class of indicators with the highest accuracy, but it's also very easy to change resolution, set presets and limits, change colors, languages and screen layout, or, as I said, move between digital and analog with a touch. Also key, the W4900 is rugged and sealed, with IP67 protection for harsh manufacturing environments in shops."

Clinton seconds those points but admits that the W4900 isn't for everyone.

"It's designed for maximum flexibility," he says. "Let's say you want to do a drop measurement and then move over to check total indicator runout (TIR) or maybe probe part flatness; you can swap between those functions quickly with no loss of accuracy. But if you're looking for a dedicated gauge that you want to set up once and forget about, we have more economical solutions available. Either way, digital is here to stay."

Do you prefer digital or dial indicators? Tell us why in the comments below.

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