WHITE PAPER

25 years and counting

Process tool innovation and impact

In the beginning, calibration wasn't a consideration for innovators whose sole concern was to create one working product. Not that they didn't need to have a standard against which they designed their product, but they certainly didn't need to calibrate for mass production and automation, such as we do today.

Consider one of the oldest functioning clocks in the world—the Salisbury cathedral clock located in England and built around 1386. This clock was built out of iron and includes a great wheel in the going train that turns once in 3600 seconds (or once an hour) and a striking train that strikes once an hour on the hour. There are teeth and pins that must match up exactly to keep the clock working accurately. The clock's designers did an amazing job creating something that could stand the test of time. But, let's fast forward a few hundred years to see how innovation and manufacturing have gone from single piece production to mass production.

Industrial revolutions

During the second half of the 18th century, the world was industrializing. Mass production was made possible by energy innovations in steam power. Small production in homes and workshops transitioned to large-scale for market, including textiles, mills, and distilleries. That was the first industrial revolution.

The second industrial revolution began in the late 19th century. In the U.S., industrial processes led the way as factories began to experiment with different materials, including plastics, lighter metals, and alloys. Mechanical and automation systems began to take a prominent role in one of the most altering innovations in industrial revolution history—the assembly line.

Assembly lines require that a process be in place to move raw materials into a finished state. The single most important factor in ensuring a successful assembly line is consistent predictability. At this point, there were no standards in place, and limits on mechanical and automation systems were not regulated in any way.

The third industrial revolution brought about the transistor and microprocessor, which led to big changes in manufacturing. The two primary inventions that impacted industry as we know it today were the programmable logic controller (PLC) and robots. This industrial revolution lasted from about 1969 to just a few years ago.

Process calibration

Today, process manufacturing plants require hundreds, often thousands of sophisticated devices that perform countless critical measurements and operations ceaselessly, accurately, and reliably. Those devices in turn require regular inspection, testing, calibration and repair. Over the past two centuries, industries have seen the value of carefully recording and baselining the details from these inspections.

Historically, the documentation process meant using a log book or clipboard to hand write the date and time, the pre-adjustment readings, the post-adjustment readings, and any other observations from the inspection. From the 1920s to 1960s, and even to a certain degree today, this pen and paper process was the norm for technicians and engineering school graduates working in the process industries. But this approach had a cost.

It was inefficient as it needed to be done multiple times per week for some equipment. Handwritten data could be illegible or insufficient. Not to mention the potential impact on the manufacturing process from missing or misread data.

Creating an efficient process for calibration

In the 1960s, there was a serious lack of available skilled operators and technicians, which made it difficult for employers to fill must-have positions. Fewer people on the manufacturing floor to perform equipment calibration meant that some equipment would be skipped or moved to the bottom of the priority list. The industry needed a streamlined, simplified process for calibration and documentation.

In the 1980s, lean manufacturing was born as a new philosophy in process manufacturing. This do-more-with-less approach was the result of serious budget cuts that surfaced as reductions in staff. This is the approach used today around the world in process manufacturing.

In the 1990s, the dust had settled after the lean manufacturing bubble burst and the industry began to see the need for tools that could perform more than one test/calibration.

Fluke process tools

Product timeline

May 1994

Debut of Fluke process tools at the ISA show in Philidelphia

1997

The 787 process meter was introduced—the first and still the only tool to combine a loop calibrator and DMM

January 2012

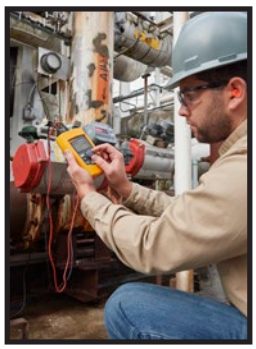
Release of the 700G Pressure Gauge Calibrator

September 2011

Release of the 753/754 Documenting Process Calibrator

February 2018

Release of the 729 Automated Pressure Calibrator



October 2018

Release of the 710 mA Loop Valve Tester

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Flight of the phoenix

In 1992, Fluke deployed two cross functional teams. One team (Team Hobbes) was tasked to pursue unmet needs in the process industries that had commercial implications, the other (Team Calvin) was tasked with looking similarly at opportunities in network testing. They were given $100K and 100 days to come back with a business plan. Team Calvin returned a business case that spawned the very successful Fluke Networks product group and Team Hobbes presented a business case describing a suite of test tool products that would improve on and serve the needs of process industry professionals working in instrumentation. From this, a roadmap was followed that defined several game-changing products and iterations that eased pain points faced by instrumentation professionals.

In May 1994, Fluke debuted the handheld 701/702 Documenting Process Calibrator (DPC) at the ISA Show in Philadelphia, Pennsylvania. The DPC was sometimes described as a multimeter, signal calibrator, electronic clipboard and computer in a one-pound rubberized box.

In 1997, the Fluke 787 Process Meter was introduced. Technicians were observed carrying both a loop calibrator and digital multimeter to the field to do routine troubleshooting. To this day, the 787 and companion 789 are the most popular tools to combine a full loop calibrator and a CAT III, CAT IV safety rated digital multimeter in one tool.

1998 was a great year. Fluke introduced a variety of single and dual function tools, perhaps most notably the 718 Pressure Calibrator that combined the features of a pressure gauge, pressure pump and mA ammeter into one compact tool not much larger than a digital multimeter. The 725 Multifunction Calibrator was also introduced, and again no bigger than a standard digital multimeter. These products really hit the mark with users and remain on the market today.

Also, in 1998 Fluke added HART instrument communication to the functionality of a DPC when it introduced the 744 to the market. The 744 Process Calibrator significantly streamlined the calibration, documenting and adjustment of HART smart instrumentation.

In 2003, Fluke introduced the first intrinsically safe-rated product into its suite of tools for use in process areas that were at risk of having explosive gasses present. By 2006, there was an intrinsically safe-rated loop calibrator (707Ex), pressure calibrator (718Ex), and multifunction calibrator (725Ex).

Fluke had a breakthrough year in 2006 for process loop troubleshooting when it introduced the 771 mA Clamp Meter. Now, technicians could measure 4-to-20 mA signals without breaking the loop (interrupting process) to connect their digital multimeter in series with the mA measurement. Later mA loop functions were added to the 771 with the introduction of the 772 and 773 per customer requests.

In September 2011, Fluke released the 753 and 754 Documenting Process Calibrators. Modernized versions of the popular legacy 740 series. The 750 series remains a popular workhorse for instrumentation professionals today.

In January 2012, Fluke entered the pressure gauge market with the release of the 700G Pressure Gauge Calibrators.

In February 2018, Fluke released the 729 Automated Pressure Calibrator. The 729, a Documenting Pressure Calibrator with HART, was similar to the 744 or 754 but specifically designed for pressure tasks with an automatic electric pump, enabling a hands-off multipoint automatic pressure calibration test.

In December 2018, Fluke released the 710 mA Loop Valve Tester. This loop calibrator includes a HART communicator and performs and documents air-operated valve diagnostic tests in one compact tool.

For 25 years, Fluke has worked hard to meet the ever-changing demands on process industry professionals. Today, we are in the very midst of the fourth industrial revolution where smart technology is making a strong impact on the process industry. No matter what the future of process industry looks like, Fluke will be there with the safest, most reliable tools—count on it.

Fluke. *Keeping your world up and running.®*

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