

## **Innovation within Flow Instrumentation**

Alicat Scientific is the Global market leader in laminar flow device / differential pressure based flow instrumentation for many differing markets across the world. We help scientists and engineers solve flow problems. When fast, accurate readings are required Alicat have long-standing, proven solutions to immediately engineer into a process. Furthermore, however, our staff are scientists, our technical knowledge is second to none and this, when combined with an inquisitive nature, ensures that innovative solutions and rapid new developments can be specifically applied. We know that our customers are working on some of the greatest challenges of the day and we love being part of the solution.

Alicat manufactures flow and pressure measurement/control instruments. The standard product line is fast, versatile, and tough. Our instruments make our customers jobs easier and reduce the number of instruments required. People love how easy they are to use and how fast they can be delivered. Equipment manufacturers however, often require even more refinements for their process. OEM products are focused on customized solutions often with different form factors, communication protocols and unique features essential for high volume manufacturing. Since its foundation some 26 years ago the concept of constant innovation and product development has been pivotal to the remarkable success and planned growth of the Company. Specifically, areas such as bi-directional mass flow measurement, precision pressure control within dead-ended non-flowing applications, multi-parameter measurement and control, true multi-gas capability and high turn-down have all benefitted from the dedication to innovation. Taking each of these innovations in turn :

**Bi-directional mass flow measurement.** By the application of either a 'positive' or "negative" set-point signal, Alicat have enabled the possibility to control flows into a process in one direction first and then to switch into the opposite direction. Alternatively, flows can be controlled into a closed process, and then vented without the need for additional bleed valves. Due to the inherently bi-directional nature of the Alicat sensor the flow is measured in both directions and a nett total provided if required.

**Dual valve precise pressure control.** Precise control of pressure reduction and pressure relief valves, from a single set-point signal ensures process pressure remains stable independent of other variables. Such processes as head space pressure control, glass reactor protection and the elimination of costly outgassing through continuous bleed valves all benefit from this innovation. Alicat electronic pressure controllers provide responsive, stable control of absolute, gauge or differential pressures in dead-ended processes.

**Multi-parameter measurement and control.** Measurement of multiple parameters on the one instrument (mass flow, volumetric flow, temperature and pressure) enables the user to eliminate additional components within a system, the pipework/fittings required to install them, cables and electronic signal conditioning plus save time and money in so doing. All parameters are displayed on a single screen for easy monitoring of process gasses or liquids. Any of the measurement parameters can be

enlarged in the centre position for reading at further distances from the instrument. All of the displayed process parameters are measured in real time, which allows you to look at the device display and quickly get an idea of how your process is operating. When a process begins to falter, this information can significantly reduce the amount of time it takes to diagnose and repair the failure. All Alicat mass flow controllers can be changed to pressure controllers or volumetric controllers via digital interface or via the display. The user can monitor mass flow while controlling pressure or vice versa.

**True multi-gas capability.** Following continuous innovation and development over the years Alicat instruments are now pre-loaded with up to 130 full gas calibrations thereby eliminating the additional measurement uncertainty introduced by conversion factors. Complete NIST Ref Prop 9 gas properties data has been loaded for each of the gases ensuring that both the standard accuracy and optional high accuracy statements remain valid regardless of the gas with no additional uncertainties. The benefits to the user are significant. Instruments are no longer limited to just one application; once a certain project has been full-filled the MFC can be used again for a different project with different gases. Similarly, even within a certain project fewer instruments are required to meet the needs of multiple gases / multiple flow rates.

**High turn-down.** Turndown ratio is a measure of the useable range of an instrument, expressed as the full-scale range divided by the minimum point of measure. It indicates how much of the instrument range can produce accurate readings, which is very important when you want to measure or control a very wide flow range without having to change instruments. Alicat instruments have a turn-down of 200:1 as standard i.e. as low down as  $1/200^{\text{th}}$  of the full scale, although with engineering collaboration this could be extended even further. As with multi-gas capability the benefits are again significant – fewer instruments are required to cover a wide measured flow regime and this results in cost savings for the user.

In conclusion, as a result of 26 years of experience, development and innovation a range of useful flow and pressure measurement and control devices has been established that, at their very core, have been designed to help the user and ultimately make their life and work easier. This innovation will never stand still and Alicat would welcome the opportunity to assist with any challenges you face and hopefully help solve the impossible !