

WHITE PAPER

Active Control

Innovative mass flow and pressure controls to deliver accuracy and precision-based performance



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Norgren – Breakthrough Engineering

The challenges and problems the world faces grow ever more complex. Businesses demand fresh thinking and new approaches to successfully tackle fundamental issues such as climate change, rapid population growth and how technology can improve quality of life.

Breakthrough Engineering is at the heart of Norgren's offering. It is an integral element, driving the essential systems we all rely upon.

From improving speed, productivity, reliability and efficiency of equipment to generating significant energy and cost savings. Norgren's solutions are designed to help OEM customers across many industries pursue progress, achieve new goals, and overcome problems.

Norgren offers insight, technical excellence and a truly collaborative approach, helping organisations forge a brighter future by delivering breakthrough engineering for a better world.

This whitepaper aims to cover the following aspects

- » Identify key challenges within the Life Science space
- » Present effective and efficient solutions to the key challenges identified



Active Control: Norgren's new solution for Mass Flow Controller (MFC) and Electronic Pressure Controller (EPC) aims to address the most crucial industry challenges related to dynamic range, footprint and cost efficiency.

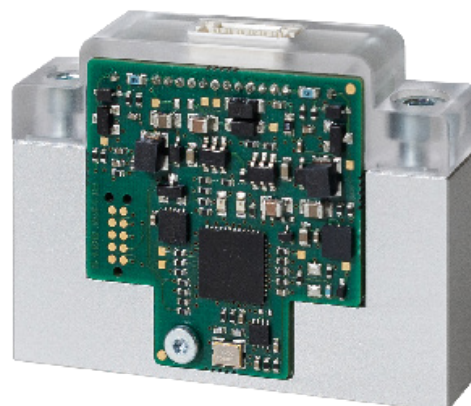


CHIPREG MFC

- » High turndown ratio – 2000:1
- » Max flow rate: up to 20l/min
- » USP class VI elastomer (316L stainless steel on request)
- » He & H compatible
- » Accuracy: $\pm 0.3\%$ full scale
- » Repeatability: $\pm 1\%$ full scale
- » Seal material: FPM

CHIPREG EPC

- » Controllable pressure range: -1 to 7 bar
- » Max flow rate: up to 10l/min
- » Media: Air, N₂, O₂, CO₂, Ar, He, H₂
- » Accuracy: $\pm 0.3\%$ full scale
- » Repeatability: $\pm 0.01\%$ full scale
- » Seal material: FPM



Customer Challenges

A critical success factor for OEMs delivering instruments for life science applications within medical, analytical, diagnostic and biotech sectors, is the ability of system components to deliver accurate control and precision based performance without compromising on cost and size

Many applications across the Life Science Sector rely heavily on Mass Flow Controllers (MFCs) and Electronic Pressure Controllers (EPCs):

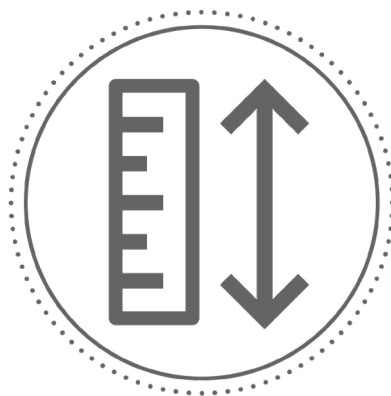
- » Analytical instrumentation such as mass spectrometry and thermal analyzers
- » Medical devices such as gas blenders and surgery devices
- » Diagnostic instrumentation such as Point Of Care Testing (POCT) or Air-Over-Liquid dosing systems
- » Biotechnology with bioreactors and microfluidics

Norgren understands the critical challenges OEMs face with both Mass Flow Controllers (MFC) and Electronic Pressure Controllers (EPC) in the Life Science industry today:

- » Ever more focus on ultra-compact devices with available installation envelopes for analytical devices shrinking
- » An increasingly wide range of specifications for individual devices that cater for a multitude of gas types, flow and pressure ranges
- » A highly dynamic competitive environment that drives ever more focus on cost-effective solutions



**Dynamic
Range**

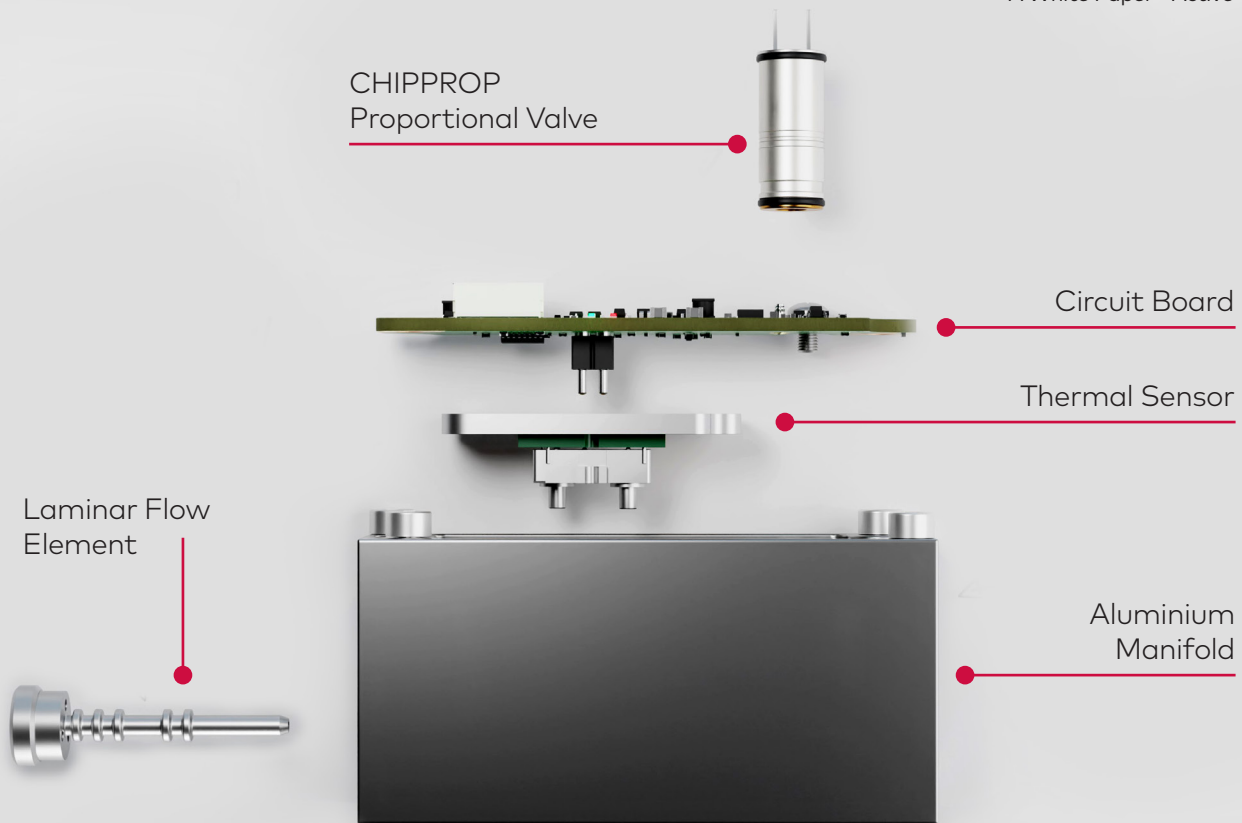


Size



**Cost
Effectiveness**

OEMs often respond with proprietary custom solutions using multiple, separate components to address the challenge at hand. Norgren's off-the-shelf proposition offers a less resource intense solution that limits instrumentation and system application complexity. We have designed and manufactured Active Control MFC and EPC solutions to provide cost-efficient and flexible specification working across a multitude of life science process applications.



Our Solution

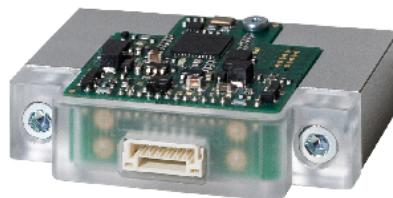
Our engineers have developed an innovative product range to help customers overcome wider specification requirements, size constraints, and competitive challenges across MFCs and EPCs. We call it CHIPREG.

Norgren has addressed the key challenges identified by OEMs using its expertise in proportional valve design, miniaturization and delivery of custom manifolds. Our fluidic experts and electronic engineers have designed an innovative, patented, and hyper-compact manifold that integrates key MFC and EPC components including proportional valves, flow sensors, electronics and control algorithms.

The result is one of the smallest available miniature devices. Balancing size and cost effectively. Enabling multi-gas control including O₂, CO₂, N₂, Ar. As well as H₂ and He. The innovative solutions our engineers came up with to optimize performance to size and cost ratio lead to several patents. Let us introduce you to CHIPREG Mass Flow Controller and CHIPREG Electronic Pressure Controller.

Active Control features at a glance

- » Compact size – smallest on the market
- » Multi-gas, including Helium & Hydrogen
- » In-line or flange mounting options
- » Best performance to cost ratio



Your Life Science Partner: Norgren

Already delivering custom design and manufacture of precision fluidic and motion control components, Norgren's long-standing expertise in the mass flow and pressure controls marketplace is evident with existing industry-leading solutions designed to support the life science sector.

CHIPREG's reduced sizing and manifold-mounted ability to be integrated into critical life science devices has seen it utilised on many applications, including water analysers, bioreactors and surgery devices among others.

In addition, Norgren's market-leading reputation for high performing proportional valve products (a central part of all MFC and EPC solutions), as well as many other pressure control devices, means the business is already delivering the precision control solutions that the life science OEM sector requires.

Norgren's heritage is built on our extensive experience in providing integrated solutions including manifold, MFC, EPC, solenoid valves, pressure regulators, fittings, sensors, etc. Already delivering plug-and-play solutions which are pre-tested to work together seamlessly; end users can simply plug the device into the rest of the instrument. Working with a single supplier, which has responsibility for the whole fluidic system, with components that are all manufactured internally offers a huge advantage for customers.

The existing Norgren Gas Inlet Manifold is a great example of this approach. An innovative and integrated device, it incorporates mass flow controllers and miniature digital valves, integrated into an acrylic manifold, to help life science OEMs reduce risk of leakage, installation time and equipment footprint. All in on device from a single manufacturer.



Manifold with
CHIPREG MFC

Active Control: try & test

Collaboration with customers is key to us at Norgren. We are looking to partner with Life Science Instrumentation OEMs to trial the new range of single device MFC and EPC solutions. Trial this newly developed range of Mass Flow Controllers and Electronic Pressure Controllers in your business. See the product in application and unlock the clear operational benefits they can provide for yourself.

For more information about trialling Norgren's newly developed range of Mass Flow Controllers and Electronic Pressure Controllers, [visit our website](#) or [contact us](#)

→ Find out more
norgren.com

Overall, we love the small form of the products and the mechanics of the design. We are looking forward to working with them.

*Technical Manager
Thermal analyzers*

We previously had to use multiple MFC to control both low and higher flows. Your dynamic range higher than 1000:1 now allows us to use a single MFC.

*Head of Engineering
Bioreactors*

Existing EPCs are not suited for high volume applications. Your EPC is the only solution on the market that meets our specs and price point.

*Procurement Manager
Automated
Pipetting Device*



Norgren operates four global centres of technical excellence and a sales and service network in 50 countries, as well as manufacturing capability in Brazil, China, Czech Republic, Germany, India, Mexico, UK and the USA.

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Incorporating



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