

Expertly designed and rapidly engineered solutions tailored to your applications



**Fluid Control & Pneumatics for Analytical & Medical Devices**  
Proven solutions and local expertise to help you overcome your toughest challenges.





In an increasingly competitive landscape, relationships with reliable expert partners become critical for your success.

## There is no room for error when working with human health

When working in medical or analytical applications, the highest levels of accuracy, reliability and purity are demanded. Every action influences human health and therefore must be supported by the industry's highest standards and leading innovations. This is not only critical for healthcare professionals, but also for devices supporting their daily work. Each decision made on individual medical components has long-term effects on system efficiencies, useful analyses and patient care. It is clear that better technologies, deeper expertise and a stronger commitment to value-creating solutions guarantees a market advantage.

**Need for more advanced technologies.** Your peers and customers are considering what's next – 2,400 patent applications in 2016 in Europe were related to medical technology industry – representing more than any other sector in Europe and showing the innovative and high-tech spirit.



**Need for expert partners.** Medical technology engineering costs ~\$120/hour on average, and design iterations can become expensive. Experienced development partners and reliable suppliers can help you reduce costs.



**Need for more than products** – with the new Medical Device Regulation (MDR) in Europe, knowledgeable suppliers become important to support your regulatory requirements. Many suppliers step back from such challenges.



# Turn to Emerson for highly technical expertise and widely adaptable offerings

Emerson's fluid control & pneumatics portfolio is uniquely designed to address the speed, specificity and exceptional quality necessary for leaders in the analytical and medical world. Working with our brands ASCO™ and AVENTICS™, means you can expect intentionally designed products adaptable to your specifications and a team of experts who understand specific application needs and your tight timelines to market.



## Ready-to-deploy technologies in made-to-order products for every application

- Find unique components & total solutions—always available in our extensive offering
- Invest in application specific customizations designed collaboratively with you
- Take advantage of analytical & medical technologies designed for precision

“Their technology is the best. If we find ourselves buying a commoditized product we are doomed to failure. My company cannot survive without the right tech.”

– Ventilator Customer



## Technical industry experts partnering across design & development

- Work with experts backed by ~100 years of experience in fluid control and pneumatics
- Reduce product development time because our experts know the specific requirements in your world area
- Access live and online experts to ensure quick service and maintenance

“I was pleasantly surprised when product development engineers requested to visit our R&D facility to discuss our new instrument design and capability requirements.”

– Oxygen Concentrator Customer



## Broad understanding of regulatory requirements

- Global footprint and local execution ensures fulfilment of supplier requirements
- Benefit from our expanded capabilities such as traceability, change control or record retention
- State-of-the-art ISO Class 8 equivalent clean rooms ensure maximum purity of products

“We greatly appreciated Emerson's knowledge and understanding of our regulatory environment and how these impact our relationship.”

– Surgical Instruments Customer



# High-quality engineering is our offering – applied industry expertise is our promise



**Clinical Lab**

Custom fluidic systems and one of the broadest offerings of miniature fluidic products paired with deep technical knowledge to get systems fully-engineered and production-ready.



**Industrial Analyzers**

Miniature solenoid valves for liquid and gas analyzers featuring easy integration, short response times and advanced flat-spring technologies to avoid contamination.



**Respiratory Care**

Proportional and general service valves ideal for gas-mixers in order to control and change the gas-mix and deliver consistently on patients' needs.



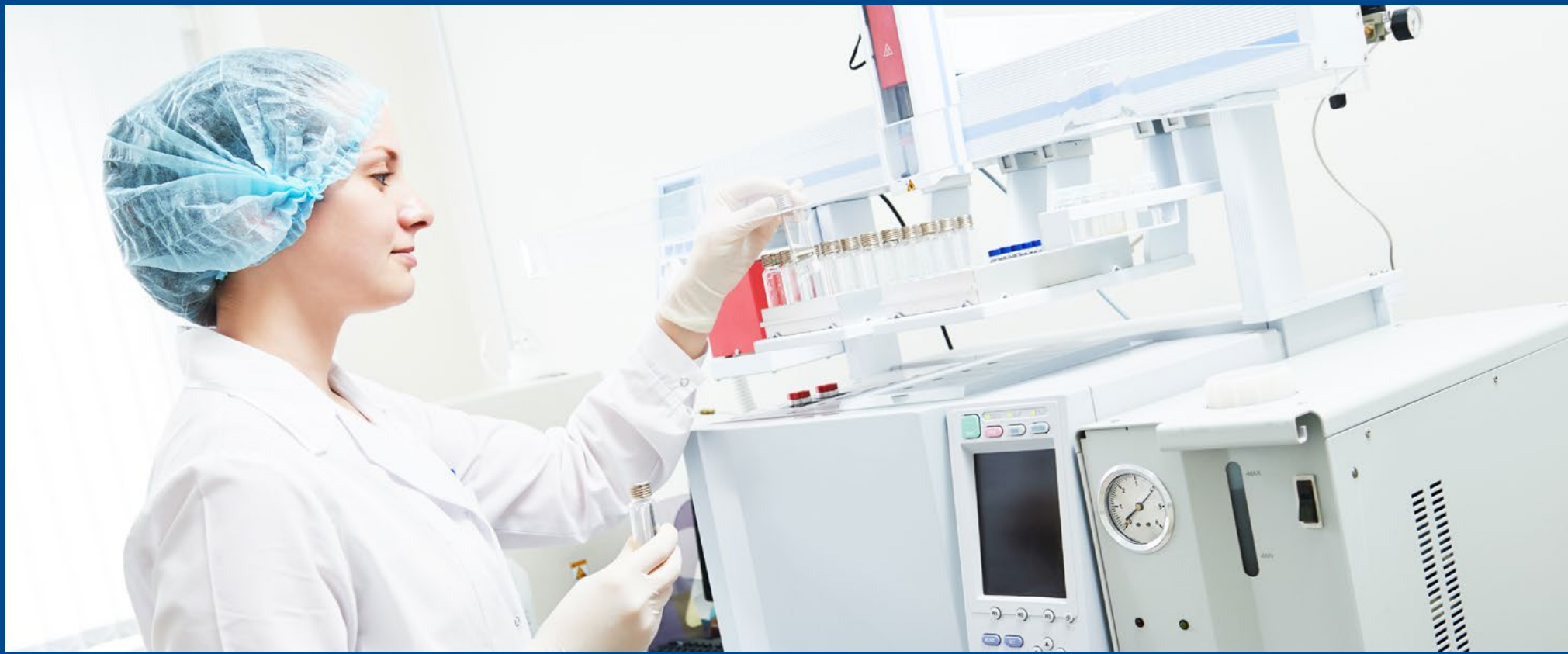
**Surgical & Therapy Equipment**

Customizable, expandable manifold solutions for surgical & therapy equipment including proportional, general service, and liquid isolation valves.



**Full Solution Provider**

Processes, Documents and Infrastructure expanding our product portfolio in order to tailor our offering to your needs.



## Clinical Lab

For the handling and dosing of samples and analytical liquids, you require maximum accuracy and a minimal external influence on the specimen.

Learn more. ► [p6](#)

## Industrial Analyzers

Management of aggressive media is a central part of most analytical instruments to be used in a variety of industrial fields. Tailored solutions will allow you to minimize external influences and optimize the fluid path to create a more efficient analyzer design.

Learn more. ► [p8](#)

## Respiratory Care

Reliable and accurate gas handling during ventilation of patients or lightweight solutions required for homecare and hospital therapy.

Learn more. ► [p10](#)

## Surgical & Therapy Equipment

Small footprint manifolds supporting a variety of functions such as air, water supply and suction, enable you to save space and time during assembly.

Learn more. ► [p12](#)

## Full-Solution Provider

Unique service that provides standard, engineered and custom valves and assemblies for your specific application, designed and delivered in a matter of days.

Learn more. ► [p14](#)

## Clinical Lab

Clinical Lab OEMs are facing intense pressure to develop new products based on evolving diagnostic detection technologies. Expert analyses, reduced prototype development time and smaller components can make a big impact. Emerson's extensive offering meets these priorities, while our product designs emphasize chemical compatibility, low power consumption and minimal heat transfer.



### What's your opportunity?

- Explore a comprehensive portfolio across valves, fittings, manifolds, pressure regulators and tubing
- Reduce system complexity and improve manufacturability with full fluidic systems that arrive fully-engineered and production-ready
- Avoid development delays with our highly responsive sales team and engineering expertise in the stringent technical requirements of the clinical diagnostic field



### Challenge

A customer in India developing a new hematology analyzer required isolation valves to control the flow of reagent and waste. High purity is demanded and there is a need for low power consumption to reduce potential heat transfer into the fluid. A very tight project deadline created the need for fast delivery of suitable solutions.

### Results

Assisting the customer with its development, Emerson's Rapid Engineered Solution program met the request for isolation valve samples within two days. Fifteen ASCO Series 110 isolation valves, which met the customer's requirements, are used to control the flow of reagent in the analyzer. In addition, the very compact ASCO Series 055 isolation valve manages waste from the washing section.

### Benefits

- Fast response helped to maintain the project schedule
- Valves met customer's challenging specifications

## Featured Clinical Lab solutions

### Series 038 Isolation Valves



- Small profile of only 5.7mm ideal for dispensing applications and precise flow control
- Very low dead volume of less than 1µl virtually eliminates potential for cross-contamination
- Low power consumption results in less heat transfer to thermally sensitive reagents
- Well-suited for aggressive media due to chemically inert construction materials

### Series 062 Rocker valves



- Universal valve for reagent handling in clinical laboratory instruments
- Removable and rotatable electrical coils allow for easy installation and worry-free maintenance
- Separation of control mechanism and fluid channel prevents contamination caused by friction of moving parts, assuring maximum purity of liquid samples

### Series 067 Rocker valves



- Rocker mechanism, combined with a separating diaphragm, prevents heat transfer to the fluid and eliminates the sticking effect of the valve seat
- Excellent self-draining capability and easy-to-flush low-volume internal cavity

## Related products

### Series 284 / 384 Pinch valves



- Hermetic separation of the control mechanism and the fluid within the tubing
- Bi-directional flow for exceptional versatility
- Removable and rotatable solenoids for easy installation
- Pinch mechanism ensures highest level of media purity

### Series 068 Flapper Solenoid Valves



- Designed for use with neutral or highly aggressive liquids in analytical systems
- Proportional versions available to control the flow of liquids and gases by varying the electrical input signal to the coil
- No pumping or sticking effects
- Reduced heat transfer makes them ideal for use with heat-sensitive reagents and biological samples.

### Series 055 Diaphragm valves



- Compact design for easy installation
- Low power consumption
- PTFE Isolation design for aggressive fluids
- Excellent self draining capability



For more information, visit [Emerson.com/Medical](https://www.emerson.com/medical)



# Industrial Analyzers

Industrial analysis include applications such as gas chromatography, liquid chromatography, spectrometry and material characterization for chemical analysis and identification of components within a mixture, and water quality analyzer or pollution emission monitoring for environmental analysis.

Emerson has extensive experience with these applications and has a broad range of ASCO and AVENTICS valves designed to cope with pressurized and aggressive materials and prevent external factors from influencing samples.



## What's your opportunity?

- Proven components made for pressurized and/or aggressive media
- Minimize external factors with media-isolated valves
- Leverage our extensive portfolio and know-how for industry-proven customized solutions

## Challenge

An analytical instrument manufacturer was designing a continuous chromatography machine for process development and single-use manufacturing. The machine incorporated a pneumatic valve to apply pressure to a proprietary diaphragm valve. The customer required a pneumatic valve that could operate with high pressure (300 psig) and low flow (<.025 Cv), plus offer Ethernet connectivity to a control system.

## Results

The customer turned to Emerson to design a turnkey fluid control solution. Emerson was the only supplier that could meet the application's high-pressure, low-flow, and Ethernet connectivity requirements in one package. The custom manifold assembly combined the Series 411 miniature valves with a G3 Ethernet manifold. Emerson's capability to meet the application's demanding requirements meant the customer did not have to redesign the instrument to operate at lower pressure and higher flow.

## Benefits

- Created single-source custom valve assembly
- Achieved customer's specific high pressure, low-flow and Ethernet connectivity requirements
- Optimized instrument's performance



## Featured industrial analyzers solutions

### Series 055 Diaphragm valves



- Compact design for easy installation
- Low power consumption
- PTFE isolation design for aggressive fluids
- Excellent self draining capability

### Series 082 Diaphragm valves



- Robust construction material ensures maximum chemical resistance
- Low power rating reduces heat transfer to samples and reagents
- Capable of withstanding high temperatures and harsh conditions

### Series 088 General service valves



- For use with air and inert gases, or as pilot valve
- Pad mount with different electrical connections to maximize versatility
- Compact design ideal for manifold setup

### Series S General service valves



- Small footprint and compact design
- Larger orifice sizes and vacuum capability provides versatility across multiple applications
- Stainless-steel construction provides corrosion protection, IP65 rated
- Available in a variety of different porting configurations for manifold and in-line mounting

### Series 202 Preciflow Proportional valves



- Proportionally control the flow of air and inert gases by varying the electrical input signal to the coil
- Low hysteresis (<3%), excellent repeatability (<1%), and high sensitivity (<0.1%)
- Well suited for vacuum applications with no minimum operating pressure

### Sentronic 614 Proportional valves



- Intelligent digital communications, such as IO-Link, enables simple operation
- Integrated visual display enables easy monitoring of valve status
- Wide pressure range and control at extremely low hysteresis



For more information, visit [Emerson.com/Medical](https://www.emerson.com/medical)

# Respiratory Care

The rapid advancement of oxygen controlling devices results in a positive impact on patient care. Emerson uniquely brings together the extensive portfolio of leading ASCO fluid control technologies to deliver safe and sophisticated solutions in ventilation and oxygen therapy.



## What's your opportunity?

- Rest assured you are investing in trusted gas mixers and general service valves designed to prioritize biological compatibility
- Collaborate with experts fluent in oxygen therapies
- Quickly access standard components or create custom oxygen therapy solutions faster than competitors

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## Challenge

A startup company was developing a low-cost ventilator for continuous respiratory support with a user-friendly design targeted at developing countries. The ventilator incorporated valves that controlled the containment, mixing and distribution of air to the patient. The company needed technical support and education on the functionality of the fluidics, a turnkey product solution, plus manufacturing support on a global basis.

## Results

Emerson supported the customer's project team with technical assistance and responded to changing requirements as the ventilator was designed. The final design used an Emerson fluid control solution consisting of standard Series 411 miniature solenoid valves and four custom solenoid valves modified to deliver the required performance. Emerson's global footprint enabled local support at the customer's design center in California and at its manufacturing centers in India and Singapore. The customer chose Emerson because it was the only supplier that could provide a high level of global application expertise, plus a comprehensive fluid control package.

## Benefits

- Provided technical support and fluidics education
- Designed comprehensive fluid control solution
- Customized valves to perform to customer's specifications
- Supported customer's global manufacturing centers

## Featured Respiratory Care solutions

### Series 202 Preciflow Proportional valves



- Proportionally control the flow of air and inert gases by varying the electrical input signal to the coil
- Low hysteresis (<3%), excellent repeatability (<1%), and high sensitivity (<0.1%)
- Well suited for vacuum operation with no minimum operating pressure
- IPC (Inlet Pressure Compensated version) reduces spring wear and tear and creates more precise control

### Series RB General service valves



- Small footprint and compact design
- Great for manifold setup
- Lightweight for portable medical devices
- Many material combinations for customization

### Series 084 General service valves



- Ideal for high density control applications such as medical devices and analytical instruments.
- High flow – capable of over 140 L/min
- Optimized for Feed-Waste function on portable oxygen concentrators
- Very long life as solenoid is isolated from contaminated waste air

## Related products

### Series 624 Pressure regulator



- Lightweight and compact manifold mount interface
- Tamper-resistant manifold design
- Excellent for oxygen therapy and ventilation applications
- 342 Special version for water in dental applications

### Series 096 General service valves



- Exceptionally long service lifetime ensures maximum reliability
- Low pressure, high flow capabilities
- Integrated spike and hold circuitry reduces power consumption
- Designed for manifold setup

### Series 065 Flat spring valves



- Long life time and high reliability
- Small footprint and compact design
- Material allows usage with a broad range of gases
- Short response times, precise adjustment and low switching noise



For more information, visit [Emerson.com/Medical](https://www.emerson.com/medical)

# Surgical & Therapy Equipment

Gas and liquid handling is a key aspect in the design of many medical devices. Whether used in operating theatres, outpatient clinics or home care environments, all devices are in direct interaction with patients. Therefore, the highest level of quality, reliability and precision is required for all components.



## What's your opportunity?

- Significantly cut down development time and cost by working with an experienced supplier.
- Leverage our extensive portfolio and know-how for industry-proven customized solutions
- Rest assured you are working with a knowledgeable partner in regulatory topics supporting your individual needs
- Quickly access samples or engineered manifolds to meet your time-to-market requirements



## Challenge

A manufacturer of Dialysis machines was looking for a control manifold to regulate the level of liquid within the blood chamber of the device. The used components in such an application have to meet challenging leakage and lifecycle requirements to ensure precision and reliability of the medical device.

## Results

Emerson engineered a multi-station manifold solution with customized 10mm valves and additional fluidic components. The entire assembly is manufactured and tested in a clean room environment. This ensures highest possible cleanliness, quality and reliability of the component.

## Benefits

- Optimum fluidic path due to integrated manifold design
- Plug-and-Play solution which can directly be assembled into the medical device
- Customized valves to perform to customer's challenging specifications



## Featured Surgical & Therapy Equipment solutions

### Series 088 / 188 General service valves



- Wide pressure range: up to 7 bar
- Suitable for all kinds of applications due to variability
- Latching coil or large-flow versions available
- Compact architecture and low power consumption make them ideal for portable medical devices

### Series RB / 090 General service valves



- Highly customizable solenoid valve construction suitable for a wide variety of gas applications
- Expected service life of 100+ million cycles creates exceptional device reliability
- Lightweight design and low power consumption make them ideal for portable medical devices

### Series 096 General service valves



- Robust solenoid valve capable of high flow rates for air and inert gases
- Compact architecture ideal for therapeutic support surfaces requiring quick inflation / deflation of air bladders
- Integrated hit & hold circuitry to reduce power consumption and increase medical device efficiency

## Related products

### Series 283 Lever valves



- Designed for use with aggressive and corrosive liquids and gases
- Large orifice sizes for high flow-rate and high pressure applications
- Ideal for quickly flushing systems and routing aggressive reagents to chemical reaction vessels and waste containers

### Series 202 Preciflow Proportional valves



- Proportionally control the flow of air and inert gases
- Well suited for vacuum operation with no minimum operating pressure
- Low hysteresis, excellent repeatability, and high sensitivity make them ideal for ultra-fine control of gases

### Series 411 General service valves



- Power consumption as low as 2W, with integrated power-save circuit capable of only 0.65W holding power
- Multiple mounting, connection, and orifice configurations to meet virtually any medical application
- Expected service life of 100+ million cycles creates exceptional device reliability



For more information, visit [Emerson.com/Medical](https://www.emerson.com/medical)

## Full-Solution Provider

While instrumentation development times are being compressed across analytical and medical industries, instrumentation complexity increases – often requiring the customization of products to reach an optimum design. Emerson's Rapid Engineered Solutions program is geared towards providing these custom solutions to OEMs faster than anyone else in the market.



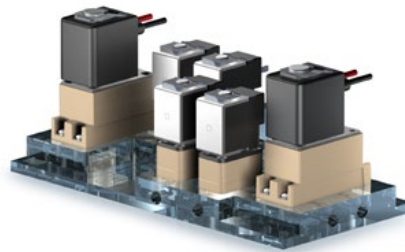
### What's your opportunity?

- Maximize efficiencies and reduce costs with turbocharged timelines – tailored solutions in a matter of days
- Fit test your fluidic path designs with our in-house 3D printing of SLA models
- Receive fully functional prototypes for beta testing
- Reach optimum design - taking into consideration your individual product specification, cost, time, size and regulatory strategy



### Work directly with expert Emerson product development engineers.

Emerson's experts deliver valve samples and customized assemblies for OEMs on your timeline. This means streamlined supply chains, simplified system designs, faster times to market, lower maintenance costs – and better patient care.



### Services offered...

- Rapid Evaluation Valve Samples: hand-delivered by an Emerson expert
- Rapid Engineered Valve Samples: suit your application with custom modifications
- Rapid Complete Solutions: custom manifold assemblies and modules – allowing full functional testing

## Custom Solutions Designed for Your Business

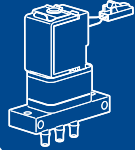
### Rapid Evaluation Valve Samples

CATALOG VALVES  
for your quick evaluation



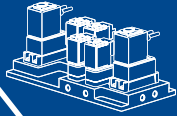
### Rapid Engineered Valve Samples

ENGINEERED VALVES with  
customized modifications



### Rapid Complete Solutions

FULLY ENGINEERED SOLUTIONS  
including all fluid-control  
components tailored to your  
unique requirements



## Comprehensive Applications

- Clinical Diagnostics Instruments
- DNA Sequencing and Bioinstrumentation
- Hospital Beds and Therapeutic Support Surfaces
- Surgical Devices
- Ventilators
- Oxygen Therapy Devices
- Chromatographic Analyzers
- Industrial Liquid and Gas Monitoring Instruments
- Sterilization Equipment
- Patient Monitoring Devices
- Dental Chairs

## Products and Technologies

- Pinch valves
- Isolation valves
- Proportional valves
- General service valves
- Manifolds
- Fittings
- Wire harness assemblies
- Filtration and regulator elements
- Sensors
- Manifold assembly

## Custom Modifications

- Seal materials
- Flow & pressure ranges
- Power requirements
- Electrical connections
- Mounting configurations

## Custom Rapid Engineered Solution Examples

### Oxygen Therapy



Customized ASCO RB Series valves control air flow through nitrogen-absorbing sieve-beds, providing purified oxygen to patients.

### Therapeutic Support Surfaces



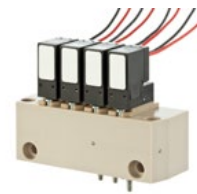
High-flow general service valves on a PBT manifold operate several individual air bladders for patient comfort.

### Dialysis



Unique assembly regulates liquid level in the blood chamber of a dialysis machine.

### Clinical Diagnostics



Custom PEEK manifold solution containing four ASCO Series 067 isolation valves for reagent control in immunoassay instrument.

### Deep Vein Thrombosis



Six-station manifold to control inflation and deflation of pressure cuffs on deep vein thrombosis device.

### Hematology



Customized plug and play modules for controlling reagents, buffers, and washing solutions in a hematology instrument.







Visit [Emerson.com/rapid-engineered-solutions](https://www.emerson.com/rapid-engineered-solutions) to learn more about our Rapid Engineered Solutions program.

## Get started



Emerson delivers time-tested and innovative solutions designed to help you improve your device's overall accuracy and reliability. Contact us now for world-class technologies and services that can maximize your medical or analytical application. Getting started is easy.

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