



Achieve process consistency, higher
product quality, and elevated productivity

Biomanufacturing Processes and Utilities
Process Control Automation Solutions





Outdated, non-integrated, and unreliable products and solutions decrease quality and process control.

Quicker start-ups, reduced downtime, and a simplified process control

As populations expand (with increasingly aging segments) and healthcare becomes more affordable, the biomanufacturing industry is experiencing a global expansion. With consistent 14-15% industry growth yearly, trends and challenges are rising, with common themes occurring across the industry.

Flexible manufacturing approaches are proving difficult (when systems aren't integrated), and many manufacturer's automation solutions are lacking. Ever-changing government regulations and growing global competition are creating further obstacles to increased scalability, speed, and quality.

End Users, OEMs, and EPCs alike are being challenged with the acute need for an experienced and technically laden automation solution provider who can supply unique solutions in process control automation.

“An ongoing biopharmaceutical trend — increasing efficiency in biomanufacturing by incorporating more automation and process control.”
— Eric Langer, Top Trends in Biopharmaceutical Manufacturing, PharmTech.com.



For OEMs, reducing lead times is key to success, and a major factor to lean manufacturing. Reducing lead times empowers OEMs to improve reliability.



“To manage projects effectively, EPCs need to manage the flow of large volumes of complex data between different systems and organizations, including suppliers, contractors, and customers.”
— An EPC Perspective, Iringtoday.



Achieve Scalability and Repeatability – sustain quality and process control

Increased process scalability and speed, with improved quality and cost, are common goals across the biomanufacturing sphere. As a trusted partner in the life science industry, Emerson understands this. That's why we offer end users, OEMs, and EPCs a wide array of unique solutions for control automation that save time and cost. Our full-breath of fluid control & pneumatics products for primary processing, utilities, valve automation, and secondary processing provide biomanufacturing institutions better control over fundamental automation parameters.



Achieve better product reliability, faster start-up speeds, and less-frequent maintenance

- Increase batch repeatability
- Enhance product utilization, while reducing equipment maintenance
- Improve safety by reducing cross-contamination

“At the moment the Plantweb™ Digital Ecosystem from Emerson is the best solution for complete automation.”
—Director, multinational pharmaceutical company



Win more projects with better lead times and reduced costs

- Utilize advanced turnkey automation solutions – save time and cost
- Overcome non-modular designs and equipment ineffectiveness
- Optimize and modernize existing processes

Research indicates most OEM engineers at life science companies are dissatisfied with lengthy lead times. Emerson's Engineered Solutions Program cuts lead times for customized valve and manifolds by up to 50%.



Reduce re-works and speed up project implementation

- Easily access, obtain and modify, vendor equipment/solution information
- Increase accessibility to SMEs
- Reduce rework and time to project by integrating systems

“ESP's business is about best-in-class delivery of life science industry solutions. We are delighted to share that distinction with Emerson.”
— Managing director, global consulting and project engineering company.

Emerson can help you overcome your on/off valve control challenges within process and utility areas

Plant Utilities (Clean-in-Place / Steam-in-Place)

- Optimize chemical use.
- Minimize cleaning time for limited disruption.
- Achieve enhanced control.
- Advance thermal efficiency.
- Improve safety by reducing cross-contamination.

Product Portfolio ► p7-8 & 11-12



Fermentation (Bioreactors)

- Control environmental conditions such as temperature, pressure, and flow for batch consistency.
- Optimize production with scalable technologies.
- Increase safety and maintain regulatory compliance.
- Utilize advanced process control capabilities.

Product Portfolio ► p7-8 & 11-12

Purification and Filtration (Chromatography and Tangential Flow Filtration)

- Closely monitor complex processes like chromatography columns.
- Accurately control filtration skids.
- Keep pace with high-yield manufacturing processes.
- Prevent damage to products and equipment.

Product Portfolio ► p7-8 & 11-12

Fill Finish

- Minimize costly waste while ensuring consistent quality and high-precision fills.
- Achieve higher throughput and streamline multi-product operations.
- Improve the speed, accuracy, and efficiency of your packaging lines.
- Regulate and isolate your process with certainty.

Product Portfolio ► p7-8 & 11-12



Maintenance Reducing Solutions

With unique offerings in process control automation, our solutions can help reduce the maintenance of your equipment, as well as meet all of your air and liquid flow control requirements. [Learn more.](#) ▶ p5

Reliability Assurance in Challenging Applications

Our position indicators, switches, and sensors can handle even your toughest applications while offering high reliability and installation flexibility. [Learn more.](#) ▶ p6

Meticulous Fluid Control

To ensure the efficacy of your clean-in-place / steam-in-place (CIP/SIP) processes—and all of your bioprocess applications—get repeatable, accurate and robust fluid pressure control results from an experienced automation solution provider. [Learn more.](#) ▶ p9

Broaden the Power of Automation

For integratable systems that are cost-effective, resilient, and that offer long lifespans, you need advanced technology. Look to our most advanced process control and safety network available, Plantweb—create architecture for all of your on-premise biomanufacturing applications. [Learn more.](#) ▶ p10

Maintenance Reducing Solutions

With the industry's broadest range of ultra-reliable products delivered and supported with exceptional speed and responsiveness, the ASCO™ and AVENTICS™ portfolio includes more than 50,000 solenoid and pneumatic valves, cylinders and actuators, air preparation equipment, and accessories.

When it comes to pneumatics and motion control products, our range provides you the best solutions to meet the requirements of your biomanufacturing applications.



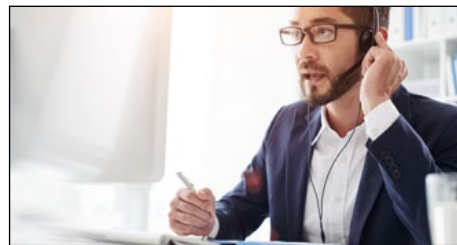
What's your opportunity?

- Achieve high levels of reliability and agility required to ensure process consistency, product quality, and high productivity.
- Maintain production efficiency and reduce down time with real-time process control.



Let Emerson help you improve your biomanufacturing processes.

Increasing your cost savings by reducing cross-contamination, media waste, and product variability is paramount to continued success. With our turnkey, integrated solutions that are scalable and modular, Emerson can provide you with a single point of responsibility for products, documentation, and support.



Services offered...

- An extensive distribution channel network that reaches around the globe
- Comprehensive, 24/7 on-demand technical support
- Custom process control solutions to make sure we are the right fit for your process
- Integrated Enclosure Solutions – dedicated teams to help design, develop and deliver integrated solutions
- Extensive product portfolio helps minimize the number of vendors managed

Reliability Assurance in Challenging Applications

When you need highly reliable position indicators, switches, and sensors to help you regulate and isolate your manufacturing processes with certainty, look to TopWorx™ products by Emerson.



What's your opportunity?

- Attain trouble free performance from your position indicators, switches, and sensors regardless of plant conditions—hot, cold, wet, abusive, corrosive, or explosive.
- Unlock full functionality in compact, direct-mount enclosures.
- Access wireless technologies and fieldbus protocols such as FOUNDATION Fieldbus, DeviceNet, AS-Interface, Profibus, and HART.



When you need high reliability, installation flexibility, and dependability in all your environments, Emerson's got you covered.

In addition to extreme temperature applications, TopWorx products are suitable for use in harsh, industrial, and hazardous areas. Our wireless technologies and fieldbus protocols can help reduce installation costs. And, with over 200 Certified Product Partners throughout the world, Emerson experts are here to help.



Services offered...

- TopWorx express shipping program for guaranteed availability
- Lifecycle services to support service requirements
- International hazardous area certifications
- Online configurator to select the right product option

Featured Products

ASCO Air Preparation



These easy-to-assemble air preparation products are available in multiple configurations, including electronic regulators, to treat air quality and pressure in your biomanufacturing pneumatic systems.

- Several filtration options with an extensive selection of bowl types and drains
- Extended temperature range capabilities (-40 °F to 176 °F / -40 °C-80 °C)
- Key lockable and tamper-proof options to use inside or outside the control cabinet

ASCO Directional Control Valve Manifolds



With an LED display and Auto-Recovery Module (ARM), you can seamlessly connect to the DeltaV™ DCS system with no need for an additional communications network: The G3 Bus Network enables remote I/O capability, and extended solenoid capacity, for all of your biomanufacturing process requirements.

- Connect directly to a panel and avoid custom machining and drilling for pneumatic connections reducing potential air leaks and simplifying maintenance
- Stainless steel mounting plate optional for corrosive environments
- Centralized or distributed valve and I/O architecture for maximum cost effectiveness

Featured products

ASCO 580 CHARMS



The ASCO 580 CHARM node integrates into the Emerson DeltaV™ Distributed Control System (DCS) for Life Science automation solutions.

- A single connection to the DeltaV system with Electronic Marshalling means a tightly integrated solution for I/O and pneumatic valve manifolds where there is no need for additional configuration tools and various network familiarity
- Single point responsibility for products, documentation and support
- The ASCO 580 CHARM node utilizes the same hardware platform as the CHARMS device to guarantee interoperability

AVENTICS Actuators and Cylinders

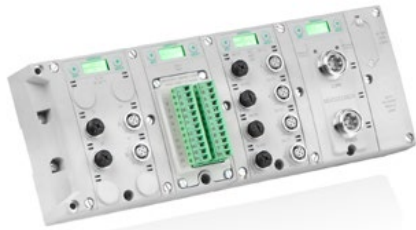


Round or square, repairable or not, compact or large, rodless or not, ASCO and AVENTICS cylinders are sure to meet your biomanufacturing requirements for performance, cost, appearance, materials, or standards.

- Comprehensive range of linear and rotary actuators to meet wide-ranging specifications.
- Rack and pinion-style rotary actuators
- ISO/CETOP and ISO/VDMA standards
- Miniature cylinders, NFPA cylinders, and guided options available

Featured products

ASCO Fieldbus Electronics



The Series G3 fieldbus electronics with discrete I/O is a completely modular system. All modules plug together via mechanical clips, allowing easy assembly and field changes making the system highly distributable. Additional flexibility is incorporated because the same modules can be used in either centralized or distributed applications. Series G3 is compatible with the highly modular Series 500 Directional Control Valves.

- Innovative Graphic Display is used for easy commissioning, visual status & diagnostics
- Power connector allows output power to be removed while inputs and communication are left active; IP65 / NEMA 4 Protection
- Auto Recovery Module (ARM) protects configuration information during a critical failure

AVENTICS Compact Valve Manifolds



The AV03 and AV05 systems provide a reliable basis for both compact handling systems and complex automation solutions. In the area of machine safety in particular, the AV family offers intelligent solutions that significantly reduce your effort in creating a safe design.

- Suits compact handling systems and complex automation solutions
- Covers requirements global automation technology, even under UL specifications and in ATEX-areas
- Intelligent solutions for machine safety demands

Featured products

AVENTICS Washdown Valve Manifold



Clean line to the maximum. The AVENTICS Series CL03 is the ideal valve system for pneumatic solutions in a washdown environment – hygienic design, utmost configuration flexibility, module extension possible at any time, and protected at the highest level..

- No joints or gaps, easy to clean; high safety through IP69K protection class
- Series CL03 is also available as a single valve in a hygienic design - with all the advantages of the product series
- First EHEDG certified pneumatics valve system

AVENTICS Smart Pneumatics Monitor (SPM)



The Smart Pneumatics Monitor module provides you with reliable information on the state of wear of the actuators as well as the energy efficiency of your pneumatic systems - without the need to involve the machine control. This minimizes the risk of machine downtimes and significantly lowers operating costs.

- Local data collection, enabling analysis independent of the controller
- Pre-installed analysis modules for condition monitoring and energy efficiency analyses
- Simple creation of individual analyses
- Support of IoT-relevant communication interfaces

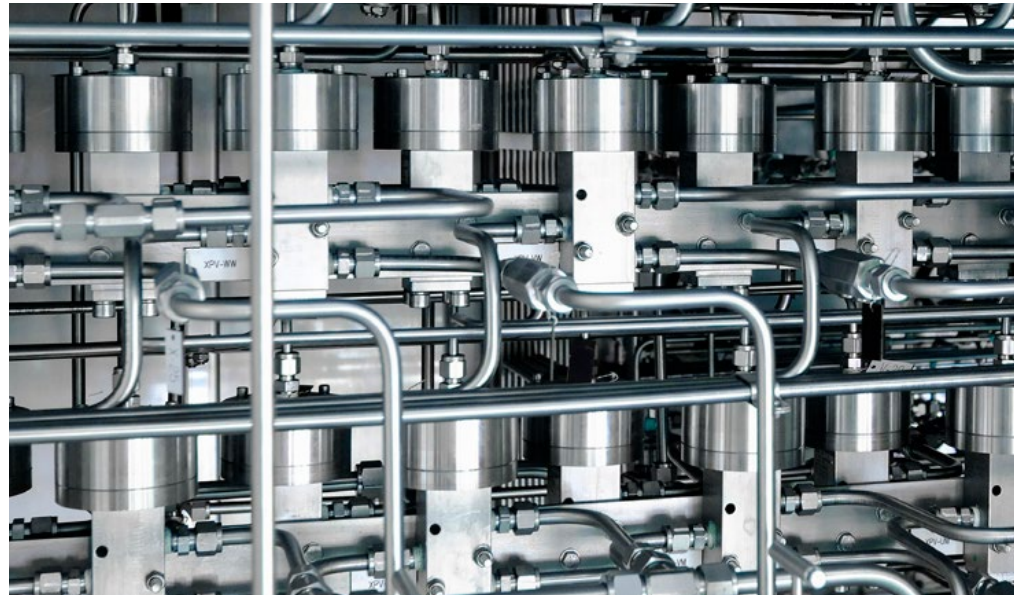


For more information, visit www.Emerson.com/LifeSciences

Meticulous Fluid Control

If you're looking for a wide range of standard and custom-engineered precision pressure control solutions for your biomanufacturing applications, TESCOM™ products are the answer. Get repeatable, accurate and robust pressure control results.

TESCOM hygienic ultra-clear pressure regulators (part of the Pharmpure™ line) for bioprocess applications are highly sensitive to extractables and leachables. These regulators are made from barstock bodies and trim parts, eliminating the need for mechanical polishing to achieve surface flatness. Pharmpure™ regulators are compliant with the most stringent industry standards, ensuring the use of non-contaminating regulators in sensitive processes.



What's your opportunity?

- Access both simple industrial application and high-tech complex project customer support for expert precision pressure control solutions.
- Achieve superior pressurization with solutions ideal for use in SIP and CIP applications.



Let Emerson help your utilities applications run smoothly.

Getting repeatable, accurate and robust pressure control is important to keeping your biomanufacturing systems running. Whether you need closed-loop control with exceptional accuracy and response, or easy to use software with remote capabilities and detailed data acquisition, Emerson can help.



Services offered...

- Solving customers' most demanding pressure control problems
- Providing defect-free products in the eyes of the customer
- Meeting customer delivery requirements

Broaden the Power of Automation

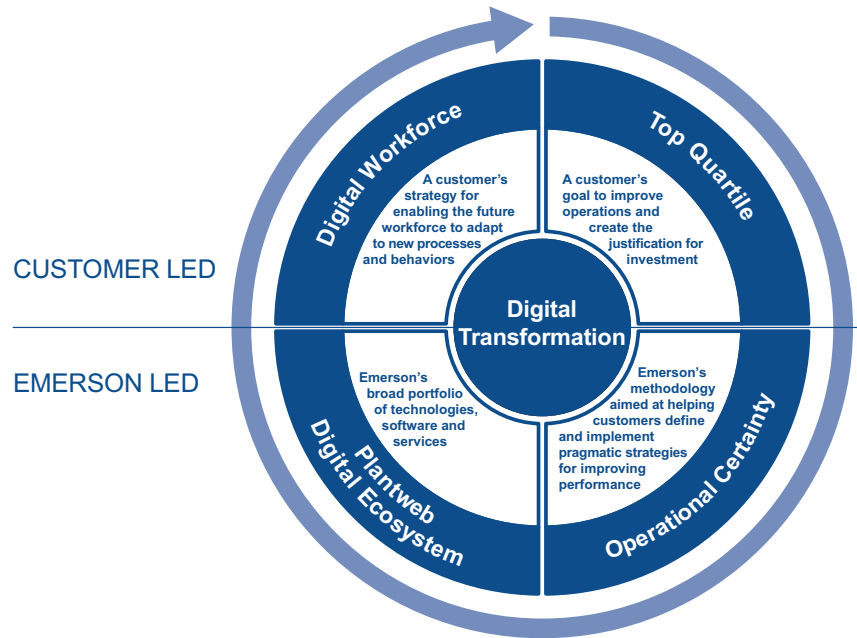
Emerson's Plantweb digital ecosystem empowers plant personnel with relevant, real-time production data and analytics to equip them to take informed actions that lead to measurable performance improvement, making them highly valuable members of their organizations.

Emerson's Plantweb digital ecosystem delivers the right information to the right people at the right time, providing operators and technicians with the actionable information they need to achieve operational performance improvements.



What's your opportunity?

- Achieve measurable performance gains in production, reliability, safety and energy management.
- Use of technologies and services equipped with actionable data that is relevant, easy to understand, and capable of being delivered wherever they are located.
- Deploy a scalable, flexible IIoT solution that enables a quick return on investment by starting small with targeted technologies, applications and services.



Technology that generates measurable returns.

Emerson's Plantweb digital ecosystem isn't Industrial IoT for the sake of Industrial IoT. It's focused on delivering tangible customer outcomes by linking strategy to business impact — and that means achieving measurable return in the key areas of production, reliability, safety and energy management. From small, targeted applications to enterprise-wide solutions, Plantweb technologies result in real performance gains that result in significant ROI and drive profitability.



Services offered...

- Data that matters
- Enhanced insight
- Scalability
- Security
- Technology that generates measurable returns
- World-class expertise and proven history

Featured products

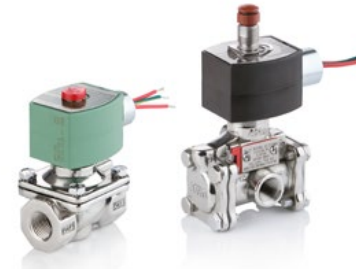
ASCO Series 290 Angle Body Valves



ASCO Series 290 angle body valves achieve precise and stable temperature regulation for fermentation applications in upstream life sciences. Due to their high reliability & long life cycle angle seat valves Series 290 are used for disinfecting line on clean in place skids. In addition, these valves are designed to handle steam up to 356°F (180°C) at high flow rate making them ideal for sterilization in place skids.

- Built for demanding applications, these valves come in a straight-through body design made of bronze or stainless steel.
- High performance, fast response time, and high flow while maintaining process accuracy
- Easy commissioning, vibration resistance, and IP65 protection class

ASCO Solenoid Pilot Valves



Offering the broadest range of ASCO solenoid valves for your air and liquid flow control requirements making them ideal for bioreactors, CIP/SIP, or any life science applications.

- Reliable spool valve technology for continuous process availability
- Low power construction for more efficiency
- Global certification, including ATEX, CUTR, UL, SIL, and more
- Solenoid Valve Series 551, Series 8210, & globe valves Series 290
- Corrosion resistant: 316L stainless steel body

Featured products

TESCOM High Pressure Regulators



All part of the Pharmpure™ product line, these high purity, high flow, single-stage regulators offer a compact, USP Class VI and BPE compliant design suitable for biomanufacturing applications.

- Features a Gylon® diaphragm
- Ideal for use in sparge gases, clean steam for sanitization, and transfer panels
- Welded sanitary connections and tube ends are available
- Precise pressure control

ASCO Integrated Enclosure Solutions



Already engineered, assembled, tested, and ready to install, these customized packages of ASCO products maximize convenience, save costs, and provide superior performance.

- CAD drawings and certification (ex. ATEX, EAC, SIL, and UL) provided to confirm compliance with your application requirements
- Build-to-blueprint construction to match customer schematics
- Single-source provider; single purchase order
- Modular designs for drop-in replacement and turnkey installation

Featured products

ASCO Zoned Safety Manifolds



The Zoned Safety Manifold solution is ideal when operator interaction is common in one or more discrete process areas (e.g. load/unload). The machine builder can safely shutdown up to 3 independent areas while other sections continue to operate normally.

- Results in compressed air savings, more throughput, and faster restarts after the shutdown area is reset due to shorter compressed air fill times
- Provides a compact, cost-effective solution where multiple safety zones could be designed to maximize process efficiency

TopWorx Position Indicators



The TopWorx TVF with LED option enables you to clearly see valve position, even in areas with low light levels, making it easier for your staff to ensure correct function or to troubleshoot issues.

- The new LED option features green and red LEDs for open and closed position indication
- Can be ordered with a solenoid operated valve for a fully integrated solution
- Intrinsically safe and suitable for all environments
- A variety of bus networks and sensor options
- Offers reliability in environment extremes

Featured products

ASCO Series 273 Pneumatic Pinch Valves



Personalized medicine and other advances in drug manufacturing have given rise to a single-use market. ASCO Series 273 pneumatic pinch valves allow customers to take advantage of the benefits of single use processes, while maintaining a level of process automation that is common on conventional stainless steel drug facilities.

- No contact with the process media, ideal for single-use batch applications
- Innovative design allows for proper tube retention leading to longer tube lifecycle
- Manual override for tube insertion / removal for unplanned batch switch

Additional products

DeltaV™ Distributed Control System
Rosemount™ Instrument and Measurement
Fisher™ Sanitary Pressure Regulator
Mirco Motion™ Coriolis Flow Meter
SolaHD™



For more information, visit www.Emerson.com/LifeSciences

A distinct, expert offering backed by the experience and resources of Emerson

Emerson's fluid control and pneumatics portfolio applies industry expertise and clever solutions to your unique business challenges today and tomorrow. We are forward-thinkers—ready to help you with smart technologies, unmatched product reliability and a proactive, consultative partnership approach designed to improve your performance.

Working with Emerson means you can innovate your process business operations without incurring unnecessary risk. Emerson experts understand the critical reliability required for your industry and foresee how fluid control and pneumatics can improve your business. With our expertise, your resources can be free to focus elsewhere.



Plan & Design

- Producing with Certainty and Agility
- Online product & CAD configurators



Implement & Build

- Application-specific expert consultations
- Ready-to-install customized packages



Sales & Service Channels

- Extensive global channel network
- Technically laden automation solutions experts



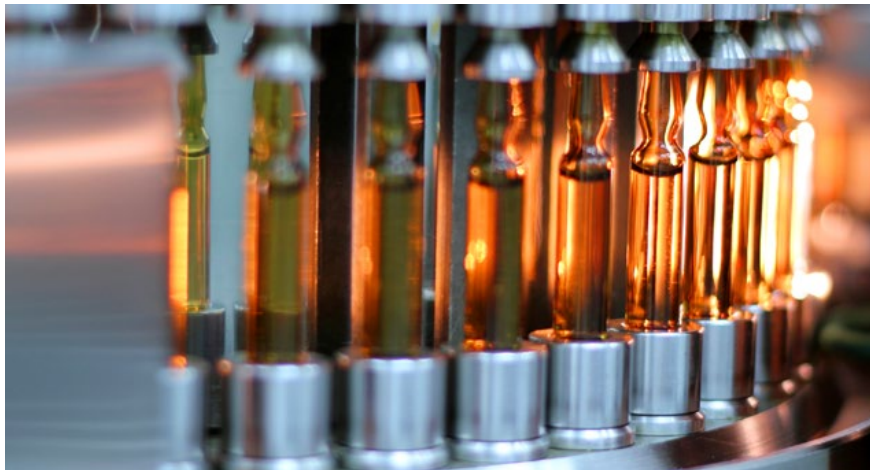
Education & Training

- Educational courses for product and technology enhancements
- Learning and training centers for workforce improvement



As a global company and single-supplier, we combine an extensive product offering invaluable industry expertise to provide you with reliable service whenever and wherever you need it.

Get started







Whether you use embedded process lab discovery technology, single-use technology, or continuous manufacturing, Emerson delivers time-tested and innovative biomanufacturing process solutions designed to help you improve your process consistency, quality, and productivity. In addition to assisting you in maintaining efficacy with real-time process control.

Emerson also offers superior solutions and innovative products to other life science segments as well. They include pharmaceutical, agriculture, botanical extraction systems, and veterinary segments.

Contact us for world-class technologies and unparalleled post-sales support to increase scalability and repeatability, while improving quality and cost. Getting started is easy.

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V7752-en-us / Printed in the U.S.A. and Europe / 03-20



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