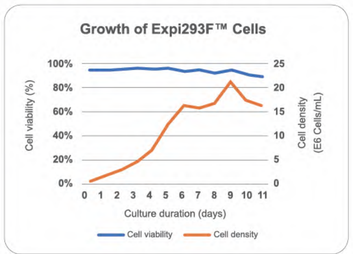
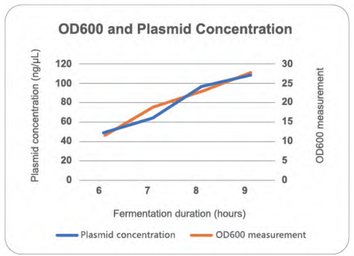
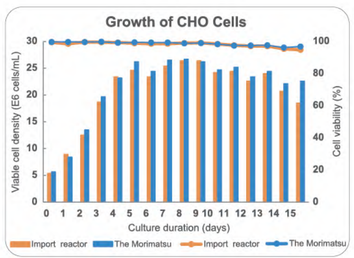
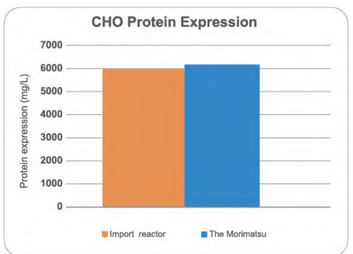
Application Cases



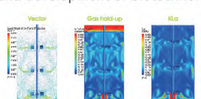


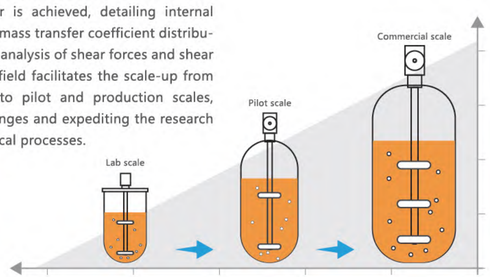




Bio-experiment Scale-up Services

Through the application of Particle Image Velocimetry (PIV) and Computational Fluid Dynamics (CFD) simulations, full flow field visualization within the fermenter is achieved, detailing internal velocity vectors, Ggas holdup, and mass transfer coefficient distribution patterns in the fermenter. This analysis of shear forces and shear stresses across the agitation flow field facilitates the scale-up from benchtop biocultural conditions to pilot and production scales, directly addressing scale-up challenges and expediting the research and development of biotechnological processes.





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The Morimatsu bioreactor/Fermenter system encompasses a comprehensive suite of products ranging from benchtop glass bioreactors/fermenters, pilot-scale bioreactor/fermenter systems, to commercial-scale production bioreactors/fermenters. This system offers an integrated solution spanning from laboratory research to production operations, catering to the needs of cell culture and microbial fermentation.

Morimatsu provides single-, twin-, and parallel glass bioreactors for microbial fermentation and cell culture in standard specifications of 1 L / 3 L / 5 L / 7 L / 10 L / 15 L. The system is powered by a robust and reliable automation platform software, based on Siemens' WinCC and a high-quality industrial-grade Programmable Logic Controller (PLC). It is designed for batch, fed-batch and perfusion culture of cells, facilitating rapid research and development and swift transition to product commercialization.

Product Advantages

- Delivers a comprehensive solution in the upstream process from research and development to production
- Enables flexible application of single or parallel experiments, significantly reducing the development cycle and enhancing cost efficiency
- Offers a high degree of customization to meet specific user requirements
- Aligns with the world's cutting-edge bioreactor and fermenter technologies
- Features industrial-grade PLC and configuration software compliant with the Good Automated Manufacturing Practice (GAMP) 5 standard
- Supported around the world by a professional and rapid-response after-sales service team

Twin Bioreactor

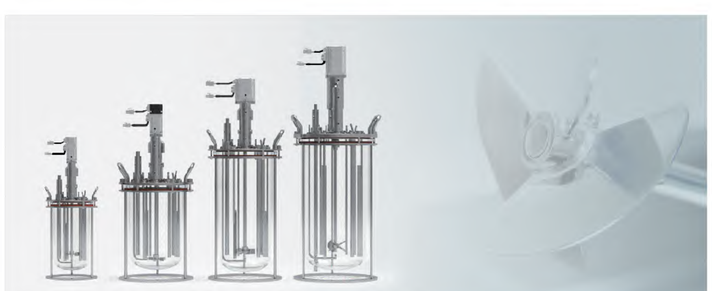
Control Software

- Offers automated solutions based on Siemens process control products
- Utilizes PCS7 and WinCC automated configuration software
- Equipped with high-quality industrial-grade PLC and
- Electrical & Instrumentation (E&I) original components The user interface (UI) is powerful, intuitive, and easy to navigate

- Supported by a professional validation team that ensures compliance with the Good Manufacturing
- Practice (GMP) requirements of regulatory bodies such as the NMPA, FDA, and EMA.

Single-Wall Glass Vessel Technical Parameters

Single-Walled Glass Vessel						
Specifications	1L	3L	5L	7L	10L	15L
Materials	High Borosilicate Glass, Stainless Steel 316L, Silicone, EPDM					
Total Volume (L)	1.6	3	5	7	12	15
Working Volume (L)	0.4–1.2	2.5	4	5	10	12
Height to Diameter Ratio	1.6	1.8	1.4	2.2	2.5	2.5
Height to Diameter Ratio at Maximum Working Volume	1	1.4	1.2	1.8	1.9	1.9
Space Requirements in Autoclave (Diameter × Height in mm)	200×450	220×500	270×500	270×700	320×780	400×900
Number of Standard Ports (including extension ports)	14	14	16	16	16	16



Control Cabinet Technical Parameters

Single-Unit Control Cabinet	
Dimensions of Single-Unit Control Cabinet (Width × Depth × Height)	350 × 400 × 650 mm
Weight	30 kg
Enclosure	Stainless steel enclosure with electrostatic powder coating
Port	2 × Ethernet ports, 1 × USB 3.0 port

Utilities	
Electrical Power	220 VAC, 50/60 Hz, 10 A
Operational Temperature	0 – 40 °C
Cooling Water Supply	Supply water pressure requirement ≤ 5 barg
Air Inlet of Control Cabinet	Utilizes standard Φ 6 air tubing for air inlet (I.D 6 × 1 mm) Gas Pressure (Air, Oxygen, Carbon Dioxide, Nitrogen) 2.0 barg ± 10 % Required gas properties: Dry, oil-free, dust-free
Air Exhaust of Control Cabinet	Utilizes standardΦ. 6 air tubing for air exhaust (I.D, 6 × 1 mm)

Temperature Control	
Temperature control range	8oC- 40oC above cooling water temperature
Heating mechanism	Electric heating pad, 120 W
Cooling mechanism	Cooling coil, connected to an external cooling water supply

Peristaltic Pump	
Internal Pumps	Variable-speed peristaltic pumps 8 – 408 rpm Standard configuration includes 4 pumps (maximum support for 6 pumps)
External Pump Port	Standard configuration includes 1 port (4 – 20 mA analog signal)

Aeration System	
Gasflow Path	Gas from control cabinet: 1 port for head space overlay + 1 port for sparger
Mass Flow Meters	Up to 4 channels Control accuracy: ± 2 % of full scale (options for higher accuracy available)
Float Flowmeters	Control accuracy: ± 5 % of full scale (calibration certificate available)
Sparger heads	Macro-bubbles: Circular distributor, 1 mm pore size; Micro-bubbles: Steel sintered bar, approx. 20 µm pore size

Agitation System	
Agitator Motor	Maintenance-free brushless servo motor
Agitator Motor Coupling Mode	Mechanical coupling/ magnetic coupling
Stirrer speed	30 – 1200 rpm
Paddle Designs	3 blades Ppropeller impeller / Rushton turbine / defoaming paddle...

Process Sensors	
Temperature Sensor	Measurement range: 0 – 100 oC Display accuracy: ± 0.1 oC, control accuracy: ± 0.2 oC
pH Sensor	pH range: 2 – 12 Display accuracy: ± 0.01, control accuracy: ± 0.02
Dissolved Oxygen (DO) Sensor	Measurement range: 0 – 150 % Display accuracy: ± 0.1 %, control accuracy: ± 1 %
Additional Sensors	Foam probe / viable cell probe / optical density (OD) probe / pressure transducer...