



Duoning Bioreactors

Turning Every Cell Culture Process
into Proven Performance.

ONE-STOP
BIOPROCESSING PLATFORM

www.duoningbio.com





Centered on cell culture and microbial fermentation, Duoning Biotech has built a comprehensive portfolio of bioreactors and fermenters that spans the entire process from research and development and pilot-scale studies to commercial manufacturing, addressing the diverse needs of different process types and application stages. The product line covers scales from laboratory to industrial production and includes a wide range of materials and platforms, such as glass, single-use systems, and stainless steel. Key offerings include benchtop glass bioreactors, single-use wave bioreactors, single-use stirred-tank bioreactors, stainless steel bioreactors, as well as benchtop glass fermenters and stainless-steel fermenters. These systems are widely applicable to various bioprocessing scenarios, including mammalian cell culture, insect cell culture, and microbial fermentation, and support both adherent and suspension cultures, as well as batch, fed-batch, and continuous perfusion processes.

Driven by sustained investment in product research and development, Duoning Biotech continuously optimizes equipment structural design, process control, automation, and system integration, establishing a product architecture that combines standardization with modularity. The company strictly implements standardized manufacturing processes and a comprehensive quality management system, applying full lifecycle quality control to critical components, system assembly, and performance testing. This ensures long-term operational stability, consistency, and traceability of the

equipment, meeting compliance requirements for both R&D activities and GMP manufacturing.

Focusing on customers' specific process requirements, Duoning Biotech provides not only equipment but also end-to-end technical support services covering the entire process lifecycle. The company assists customers with process development and parameter optimization, enabling smooth scale-up from shake flasks and laboratory studies to pilot and large-scale production, and supports the implementation of commercial GMP manufacturing. With a dual-track product strategy encompassing both single-use and reusable systems, we are able to flexibly address customers' varying needs in terms of process flexibility, capital investment strategies, and long-term production stability.

In addition, Duoning Biotech offers complementary solutions for cell culture quality analysis and process monitoring, including cell analyzers, bioprocess analyzers (biochemical analyzers), and shake flask products for early-stage process screening and condition optimization. These solutions enable efficient screening, precise monitoring, and robust process control across different development stages. Through a comprehensive system of pre-sales technical consultation, application support, and after-sales services, we work closely with our customers to shorten process development timelines, reduce scale-up risks, and accelerate the transition of bioprocesses toward large-scale and commercial production.

DuoBioX® Explore Multi-Parallel Benchtop Glass Bioreactor

DuoBioX® Explore is mammalian and microbial cell culture bioreactor system with leading design, excellent performance, complete functions and easy operation. Users only need one computer to control 1 to 8 glass tanks to run independently or in parallel. In this way, it can greatly speed up the process development progress. The DuoBioX® Explore system is best choice for the process development study of cell culture in the biopharmaceutical industry.



Concept of Design: The DuoBioX® Explore system fully meets the requirements of bioreactor technology for biopharmaceuticals applications. The process software uses a concise design language which is easy-to-operate. The complete set of electrical components of the controller are from industry leading suppliers and highly integrated with small footprint, saving your precious benchtop space.

Material of Construction: The stainless-steel parts of the tank in contact with the liquid are made of SUS316L stainless steel, and the inert surface is easy to clean due to electrolytic polishing. The glass body of the tank is made of high-quality tempered borosilicate glass, and the sealing material is made of EPDM or silica gel that meets the requirements of FDA. The non-liquid contact part is made of high quality SUS304 stainless steel.



Hardware: Integrate a full set of hardware from industry leading suppliers, ensures stable and reliable system performance:

- German SIEMENS S-1200 series PLC
- Swiss METTLER TOLEDO pH gel sensor
- Swiss HAMILTON DO optical sensor
- UK Watson-Marlow variable speed peristaltic pump
- Japan Panasonic servo stirring motor
- Japan SMC solenoid valve
- US Dwyer rotameter
- US ALICAT mass flow meter

Advantages

- Multiple tank specification options, including 500 mL, 3 L, 7 L and 15 L.
- Satellite design provides great flexibility for system expansion, quickly realize multi-connection or parallel control of 1 to 8 tanks, DuoBioX® Explore system can easily realize parameter setting, process program calling, data backup, and can compare and analyze the trend of different batches under the same interface.
- Powerful software functions can realize full control based on feedback, time, conditions and script recipes, which can meet the strict process requirements.
- The operating system developed based on the WinCC industrial-grade architecture meets the requirements of GMP and 21 CFR Part 11, and can be used in pharmaceutical and medical industries.
- Complete network communication interface, docking with SCADA to realize data collection and remote monitoring.
- In addition to basic DO, pH, temperature, liquid level, stirring control unit, the system can provide up to three gas supply channels, including overlay gas supply, macro-sparg bottom gas supply and micro-sparg bottom gas supply, allowing users to design flexible air supply strategy, and easily support high-density perfusion cell culture process; the optimized exhaust gas cooling device can effectively prevent clogging, and is compatible with fermentation/high-density cell culture.
- The controller is designed with 2 additional input ports, which can be connected to sensors, such as sensors of cell density, CO₂ and weighing, and additional signals can be integrated in control loop.

DuoBioX® Explore Multi-Parallel Benchtop Glass Bioreactor

Model	Explore 500 mL	Explore 3 L	Explore 7 L	Explore 15 L
Function	Mammalian cell culture (compatible with microorganisms), control up to 8 tanks			
Tank				
Working volume	400 mL	2 L	5 L	10 L
Max working volume	500 mL	3.1 L	6.8 L	15 L
Min working volume	100 mL	0.6 L	1.5 L	3.2 L
Aspect ratio	2:1	1.9:1	2.2:1	
Np value	1.5			
Blade	3 pitched blades 45°			
Blade diameter	35 mm	45 mm	60 mm	75 mm
Gas supply tube diameter	4 mm	6 mm	8 mm	8 mm
Macro-sparge diameter	0.5 mm	1 mm		
Macro-sparge number	3	5	7	9
Micro-sparge pore size	none	5 μm for optional		
Controller				
pH sensor	Inpro3100i/SG/ 225		Inpro3100i/SG/ 325	Inpro3100i/SG/ 425
DO sensor	243666-142/225 (optical) H2		243666-142/325 (optical) H2	243666-142/425 (optical) H2
CO ₂ sensor	Optional			
Overlay	Rotor flow meter (MFC for optional)			
MFC-Air	0~0.1 L	0~0.5 L	0~1 L	0~3 L
MFC-O ₂	0~0.1 L	0~0.5 L	0~1 L	0~3 L
MFC-CO ₂	0~0.1 L	0~0.1 L	0~0.5 L	0~1 L
MFC-N ₂	Optional			
MFC-O ₂ micro sparge	0~0.1 for optional		0~0.5 for optional	0~1 for optional
Built-in peristaltic pump	4xWaston Malow 114D variable speed pump			
Temperature control	Electric heating base 100w; Cold water solenoid valve			
Exhaust gas cooling	none	Semiconductor or water cooling		
Weighing	Optional			
Control software (need to be installed on user's computer)				
21 CFR Part 11	Yes			
Data record	Yes			
User authorization management	4 levels			
Utility requirements				
Gas source	Air, O ₂ , CO ₂			
Gas source pressure	0.2-0.3 MPa			
Control cabinet power supply	220 v 50 Hz			
Power socket	10A three-hole			
Cabinet dimension	Length*width*height: 554*188*404 mm			
Single tank external dimensions	Height*diameter 357*100 mm	Height*diameter 430*210 mm	Height*diameter 510*250 mm	Height*diameter 690*280 mm
Cabinet net weight	45 kg			
Tank net weight	2 kg	8 kg	11 kg	15 kg

DuoBioX® Elite Series Benchtop Cell Culture Bioreactor

Duoning DuoBioX® Elite is a benchtop cell culture bioreactor system that supports dual culture modes. Users can quickly establish and develop cell culture processes ranging from 3 to 15 liters with this system, achieving process establishment, development, and optimization with a highly cost-effective investment. The DuoBioX® Elite system is ideal for the early development of cell culture processes in scientific research institutions or the biopharmaceutical industry.

Design Concept: The Elite system fully complies with the technical performance requirements of bioreactors in the biopharmaceutical industry. The process software employs a user-friendly design language to facilitate easier operation. The system operates stably and reliably, occupies minimal space, and offers users options for both touch and mobile operation platforms.

Material of Construction: The stainless-steel parts of the tank body that comes into contact with the liquid is constructed from SUS316L stainless steel and is electropolished to create an inert surface that is easy to clean. The glass tank body is made of high-quality tempered borosilicate glass, while the sealing materials consist of EPDM, silicone, and other substances that comply with FDA requirements. The non-liquid contact parts are made from high-quality SUS304 stainless steel.



Advantages:

- Various tank specifications are available, including 3L, 5L, 7L, 15L and more.
- The software is powerful and capable of comprehensive control based on feedback, time, conditions, and script recipes, effectively meeting the user's stringent process requirements.
- The operating system, developed on the WinCC industrial-grade architecture, complies with GMP and 21 CFR Part 11 regulations, making it suitable for use in industries such as pharmaceuticals and medical devices.
- In addition to the fundamental parameters of dissolved oxygen (DO), pH, temperature, liquid level, and stirring control units, the system can accommodate up to three ventilation gas pathways: surface ventilation, macro sparger bottom ventilation, and micro sparger bottom ventilation. This flexibility allows users to implement diverse and adaptable ventilation strategies, effectively supporting high-density perfusion culture processes. Furthermore, the optimized exhaust gas cooling device significantly reduces the risk of exhaust gas filter blockage and is compatible with both fermentation and high-density cell culture applications.
- The controller is designed with additional input interfaces to connect sensors, such as those for cell density, CO₂ levels, and weighing. It can also accommodate additional sensors in the control feedback system.



DuoBioX® Elite Series Benchtop Cell Culture Bioreactor

Model	Elite 500mL	Elite 3L	Elite 7L	Elite 15L
Function	Cell culture type, 1 control 1 or 1 control 2 (optional)			
Tank body				
Working volume	400 mL	2 L	5 L	10 L
Total volume	500 mL	3.1 L	6.8 L	15 L
Min. working volume	100 mL	0.6 L	1.5 L	3.2 L
H-to-D ratio	2:1	1.9:1	2.2:1	2.0:1
Np value	1.5			
Impeller	3 inclined blades 45°			
Impeller diameter	35 mm	45 mm	60 mm	75 mm
Vent pipe diameter	4 mm	6 mm	8 mm	
Macro sparger pore size	0.5 mm	1 mm		
Number of macro spargers	3	5	7	
Micro sparger pore size	None	Optional		
Controller				
pH sensor	Gel / 120	Gel / 225	Gel / 325	
DO sensor	243666-112/120 (Optical) H2	243666-132/225 (Optical) H2	243666-142/325 (Optical) H2	
CO ₂ sensor	Optional			
Overlay vent	Rotor flow meter			
MFC-Air	0~0.1 L	0~0.5 L	0~1 L	0~2 L
MFC-O ₂	0~0.1 L	0~0.5 L	0~1 L	0~2 L
MFC-CO ₂	0~0.1 L	0~0.5 L		0~1 L
MFC-N ₂	Optional			
MFC-O ₂ micro sparger	0~0.1 Optional		0~0.5 Optional	0~1 Optional
Built-in peristaltic pump	4x built-in, viable speed			
Temperature control	Electric heating base 100w Cooling water solenoid valve	Electric heating blanket 400w Cooling water solenoid valve		
Exhaust gas condensation	None	Semiconductor or water cooling		
Weighting	Optional			
Control software (needs to be installed on the user's computer)				
21 CFR Part 11	Yes			
Data records	Yes			
User authorization management	4 levels			
Utility requirements				
Air source	Air, O ₂ , CO ₂			
Air source pressure	0.2-0.3 MPa			
Control cabinet power supply	220 v 50 Hz			
Power socket	10A three-hole			
Control cabinet dimension	Depth*Width*Height 520*350*618 mm			
External dimensions of a single tank (w/o exhaust condenser)	Height*Diameter 357*100 mm	Height*Diameter 410*210 mm	Height*Diameter 520*250 mm	Height*Diameter 620*280 mm
Control cabinet net weight	35 kg			
Tank net weight	2 kg	8 kg	11 kg	15 kg

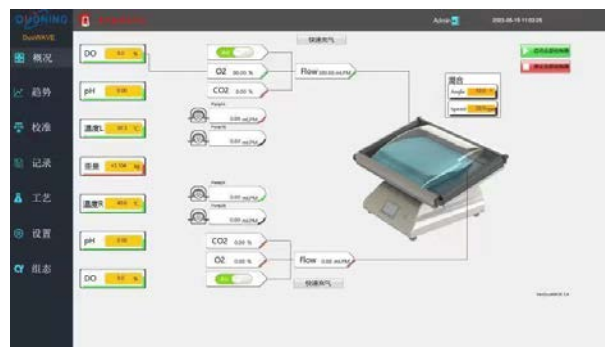
DuoWave® Wave-type Single-use Bioreactor

The DuoWave® wave-type bioreactor features a unique mixing mechanism that provides a gentler growth environment for cells. Its newly designed process control software offers rich functionality with a clean and intuitive interface, making it easy for users to operate and master. The DuoWave® system supports a working volume range of 100 mL to 25 L, making it suitable for rapid expansion of various cell types, seed preparation, process development, and quick laboratory-scale sample production.

Key Features

The DuoWave® wave-type bioreactor adopts a brand-new modular design, consisting of four modules: base unit, tray, I/O module, and server. It enables quick installation, easy operation, and space-saving integration.

- The base module provides temperature control, rocking agitation, weighing, and exhaust gas heating functions. The tray features a quick-connect design for fast replacement.
- The tray is available in 20 L and 50 L specifications and adopts a dual-zone heating plate design, allowing independent temperature control of two cell culture bags.
- The I/O module integrates single-use optical pH and DO sensors, gas mixing, and high-precision peristaltic pump functions, enabling easy implementation of process parameter feedback control.
- The server module includes DuoWave® control software and a computer, allowing users to perform process control, audit trail management, data recording, four-level user access control, and batch report generation. The DuoWave® wave-type bioreactor system complies with GMP and 21 CFR Part 11 regulatory requirements.



Applications:

Depending on the mode of operation, DuoWave® wave-type bioreactors can be applied to

- Seed Expansion
- Fed-Batch
- Perfusion
- Microcarrier-based Culture

Depending on different applications, DuoWave® wave-type bioreactors can be applied to

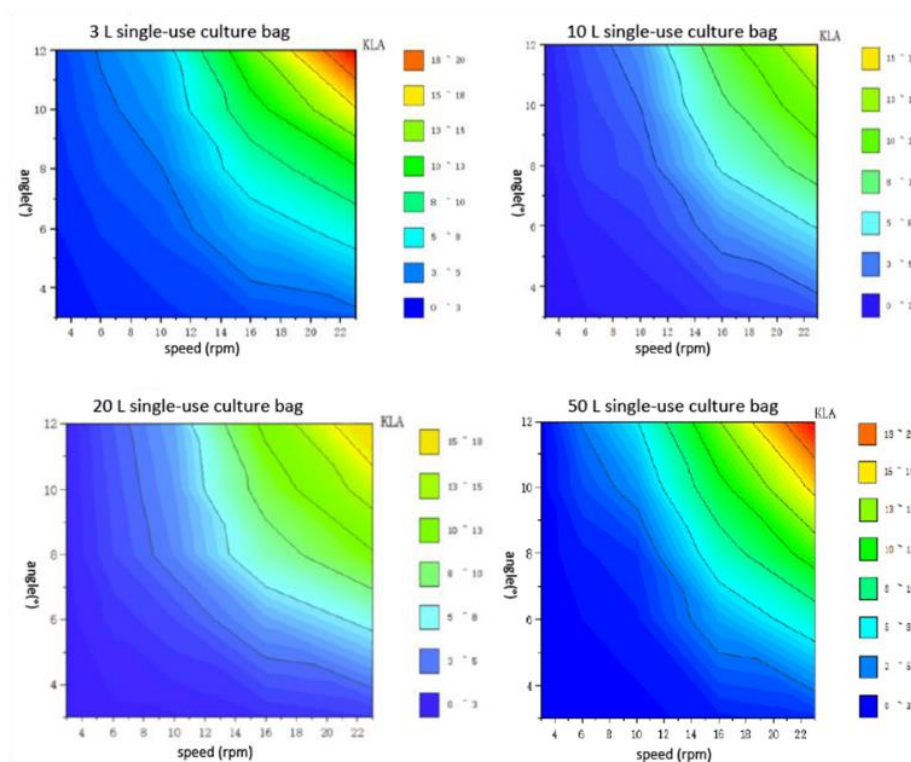
- Antibody and recombinant proteins
- Vaccine
- Gene therapy
- Cell therapy
- Other biologics or macro molecular

Mass Transfer and Mixing Performance:

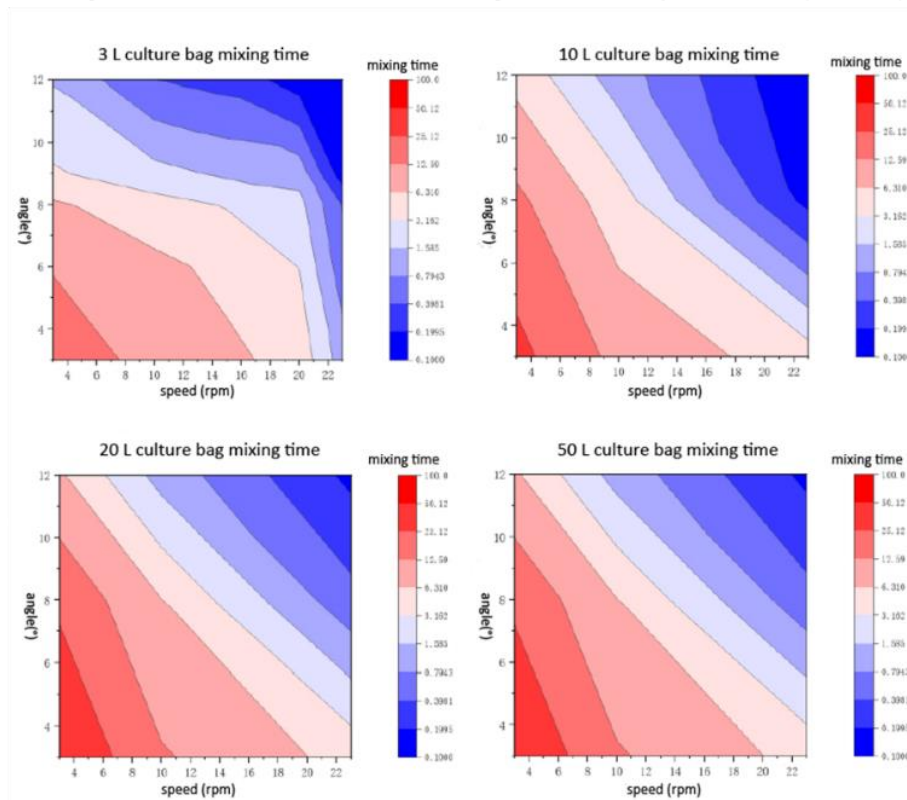
DuoWave® wave-type bioreactor system not only has excellent mass transfer and mixing performance but also brings extremely low shear force and suitable growth environment for cell culture due to its unique non-sparging aeration and non-stirring design.

DuoWave® Wave-type Single-use Bioreactor

K_{La} at different rocking speeds and angles



Mixing time test with full load of culture bags of different specifications (minutes)



DuoWave® Wave-type Single-use Bioreactor

Configuration

Module	Main Module Model	Configuration	Parameters
Base		Temperature Control Module	Dual-plate independent temperature control; continuously adjustable from RT to 42°C; PID closed-loop control; optional customizable water-cooled base plate
		Rocking Mixing Module	Rocking angle continuously adjustable from 0–12°; speed continuously adjustable from 0–40 rpm
		Weighing Module	0–50 kg; can be integrated with peristaltic pumps
		Exhaust Gas Heating Units (2 units)	Automatic constant temperature control at 60 ± 10°C
Tray	Tray20 	Dual Independent Temperature Measurement & Heating Plates with Lid	Suitable for DuoWave® 3 L (2 L), 10 L, and 20 L cell culture bags
	Tray50 	Dual Independent Temperature Measurement & Heating Plates with Lid	Suitable for DuoWave® 22 L and 50 L cell culture bags
I/O Module	I/O Module 	Two variable-speed peristaltic pumps Optical DO and pH sensors Gas mixing unit Oxygen and carbon dioxide concentration sensors	Peristaltic pump flow rate ranges: 0–5 mL/min (#13), 0–22 mL/min (#14), 0–80 mL/min (#16), 0–200 mL/min (#25). DO measurement range: 0–250%; pH measurement range: 4.5–8.5. Gas flow range: 0–1.0 L/min; fast gassing: 2 L/min; CO ₂ range: 0–20%; O ₂ range: 0–80%.
Server Module	Microsoft Surface 	Microsoft Surface Pro 7 (with built-in DuoWave® control software)	i5, 8 GB RAM + 128 GB storage, standard configuration with original Surface Pro keyboard
	Laptop 	Dell Laptop (with built-in DuoWave® control software)	Ultra 5 processor, 16 GB or above RAM, 512 GB or above SSD
	User-supplied computer 	User-provided computer (DuoWave® control software installed by manufacturer)	i5 or above processor, 16 GB or above RAM, 512 GB or above SSD; Windows 10 or Windows 11 Pro

DuoWave® Wave-type Single-use Bioreactor

	Dimension	Weight
Base	470*560*264 mm	27.7 kg
20L Tray	792*535*62 mm	10.7 kg
50L Tray	904*688*74 mm	16.9 kg
20L Tray (w/ cooling)	792*535*65 mm	15.4 kg
50L Tray (w/ cooling)	904*688*77 mm	21.9 kg
20L top cover	832*549*274 mm	4.9 kg
50L top cover	904*688*307 mm	6.3 kg
I/O module	310*418*185 mm	10.8 kg
pH optical fiber	1.5 m	
DO optical fiber	1.5 m	

Base Unit	Specifications
Rocking Speed	0–40 rpm
Rocking Angle	0–12°
Weighing Range	0–50 kg
Weighing Accuracy	10 g
Temperature Sensor	Pt100
Temperature Measurement Range	0–80 °C
Temperature Measurement Accuracy	±0.1 °C
Temperature Control Range	Ambient to 42 °C
Temperature Control Accuracy	±0.2 °C

I/O Module	Specifications
Gas Flow Range	Air: 0–1.0 L/min (default max limit 2.0 L/min, adjustable); CO ₂ : 0–20%; O ₂ : 0–80%
Gas Flow Accuracy	0.5% of full scale
Fast Gas Fill Flow Rate	2.0 L/min
CO ₂ Control Range	0–20%
CO ₂ Measurement Accuracy	±5% of reading or ±0.1% CO ₂ (whichever is greater)
CO ₂ Control Accuracy	±0.5%
O ₂ Control Range	N ₂ mode: 0–80%; Air mode: 21%–80%
O ₂ Measurement Accuracy	±1.5% FS @ (5–55)°C
O ₂ Control Accuracy	±0.5%
pH Measurement Range	pH 4.5–8.5
pH Control Range	pH 6.0–8.0
pH Measurement Accuracy	±0.05 pH (within ±0.25 pH of calibration value); ±0.1 pH (within ±0.25 to ±0.5 pH of calibration value)
pH Control Accuracy	±0.05 pH
DO Measurement Range	0–250%
DO Control Range	0–100%
DO Measurement Accuracy	±5%

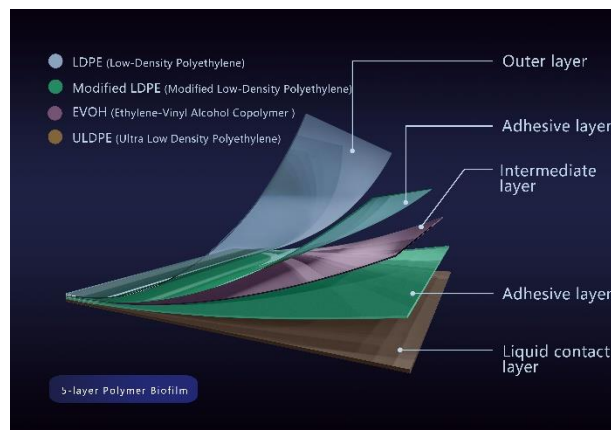
Peristaltic Pump	Specifications
Number of Pumps	2
Flow Rate Range	0–200 mL/min
Pump Accuracy	±5% of total volume
Supported Tubing Sizes	#13 (1/32 in–5/32 in); #14 (1/16 in–3/16 in); #16 (1/8 in–1/4 in); #25 (3/16 in–5/16 in)

DuoWave® Wave-type Single-use Bioreactor

DuoWave® Cell Culture Bag

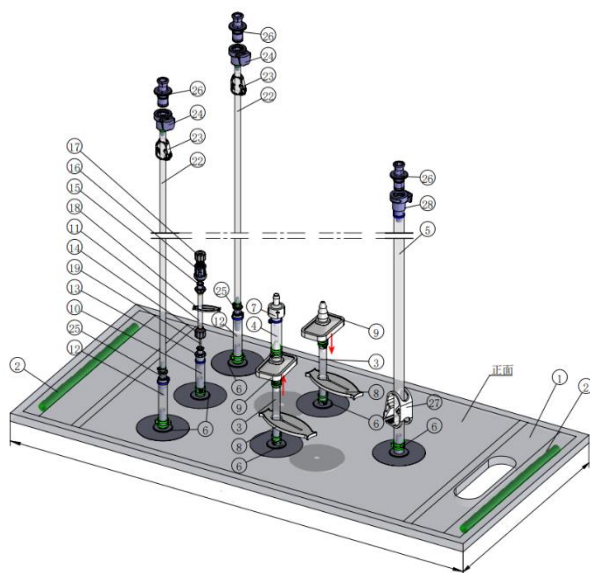
Features of DuoFilm®-003 film material: DuoFilm®-003 is a 5-layer coextruded film that withstands the harshest physical requirements while exhibiting excellent cell culture compatibility.

- The outer layer is low-density polyethylene (LDPE), which has excellent chemical stability and elongation.
- The middle layer is ethylene-vinyl alcohol copolymer EVOH, which exhibits excellent barrier effect on gases, odors, solvents, etc., while maintaining flexibility and strength properties
- Liquid contact layer is ultra-low-density polyethylene (ULDPE) for excellent biocompatibility and low extractable levels while providing a clean, inert surface with no anti-blocking additive ingredients.



We provide DuoWave® cell culture bags with various sizes and configurations for different bioprocessing applications.

Configuration	Description
Tubing Material	Optional silicone tubing or weldable tubing
pH/DO	Optional with optical sensors or without sensors
Volume Options	Available in 3 L, 10 L, 15 L, 20 L, 22 L, and 50 L
Sampling Port	Luer sampling port
Film Material	DuoFilm®-003



28	1/4" Female CPC Quick Connector , PC	1	
27	Clamps 3/8"OD≤5/8 inch	1	
26	MPC Coupling Plug , PC	3	
25	Straight Through Reduction 1/4"-1/8" Polypropylene	2	
24	1/8" Female CPC Quick Connector , PC	2	
23	Clamps 1/8"OD≤1/4 inch	2	
22	1/8"×1/4" Platinum Silicone Tubing	2	1200
21	DO Single-use Sensor	1	
20	pH Single-use Sensor	1	
19	FEP Tubing, 1/32"ID x 1/16"OD	1	90
18	FortubingOD5.0mm-6.0mm Material:PP	1	
17	Non-Vented Luer Thread Cover	1	
16	Needlefree Swabable Valve Female Luer to Male Luer Lock, Polycarbonate	1	
15	3/32" HB tubing with female Luer Thread Style	1	
14	3/32" HB tubing with male luer plug	1	
13	1/4" HB to Female Luer Thread	1	
12	1/4"×3/8" Platinum Silicone Tubing	2	60
11	1/16"×3/16"Platinum Silicone Tubing	1	50
10	1/4"×3/8" Platinum Silicone Tubing	1	50
9	Air Filter 0.2μm	2	
8	FortubingOD8.0mm-9.0mm Material:PP	2	
7	1/4" Air stop valve	1	
6	1/4" Bag Port	6	
5	1/4"×7/16" Platinum Silicone Tubing	1	1200
4	1/4"×7/16" Platinum Silicone Tubing	1	50
3	3/16"×5/16" Platinum Silicone Tubing	2	80
2	180mm Fiberglass Stick	2	
1	3L Wave Single Use Storage Bag	1	
ITEM NO.	DESCRIPTION	QTY.	LENGTH (mm)

DuoBioX® Pro Single-use Bioreactor

DuoBioX® Pro single-use bioreactor adopts bottom-stirring tank design, which can realize linear scale-up from 50L to 2,000L. Combined with 3D disposable cell culture bags independently developed and manufactured by Duoning, there bioreactors features good biocompatibility, together with flexible connection design, they can meet all requirements of complex upstream processes; their unique combination design of stirring and ventilation, not only reduce shear but also ensure excellent mass transfer and mixing performance, thus achieving good consistency during scaling-up. The DuoBioX® Pro single-use bioreactors can be widely used in various stages from process development to GMP production of biopharmaceuticals.



Features:

- The cell culture bag features good biocompatibility, extremely low extractables and leachable, and ensures the safety of the product. All materials in contact with the product have passed relevant validation requirements of CFDA for single-use system and meet USP standards.
- The system is designed with Siemens PLC+WinCC system, can be connected to SCADA data management system, all data can be recorded and exported, and supports audit trail, while complying with 21CFR Part 11 regulations.
- The system integrates optical dissolved oxygen sensor with DO resolution of 0.1% and control accuracy of $\pm 2\%$, the pH resolution is 0.01 with control accuracy of ± 0.02 ; and temperature resolution is 0.1°C with control accuracy of $\pm 0.5^{\circ}\text{C}$; the weighing accuracy is $\pm 3\%$ with pressure accuracy $\pm 0.2\%$.
- The default configuration provides 3 channels of gas supply: macro-sparg bottom gas supply (0.05 vvm oxygen, 0.05 vvm air, 0.025 vvm carbon dioxide), micro-sparg bottom gas supply (0.025 vvm oxygen), overlay gas supply (0.05 vvm oxygen, 0.05 vvm air). All use Swiss Vogtlin or German Bürkert mass flowmeter.
- 1-2 way exhaust heating as standard (depending on the model of the culture bag); magnetic coupling stirring device with inclined angle at the bottom, speed 0-300 rpm, temperature control range $20-50^{\circ}\text{C}$.
- Mettler-Toledo high precision load cell unit.

Advantages:

- Hardware: The main spare parts are from industry leading suppliers, thus improving the product quality and stability of the hardware and reducing failure rate
- Software: With rich experience in bioreactor development and careful consideration of characteristics of various cell culture processes, Duoning has built a mature control software system.
- Service: Professional technical service team, after-sales training and services of bioreactors will be provided by experienced engineers, until end-users master all required skills.
- After-sales: Relying on the strong after-sales service team of Duoning, we have set up offices in various regions and can respond immediately to technical and after-sales problems.

Culture bag fixing
bracket

Tank ware jacket for
temperature control

Magnetic drive
motor

Mettler-Toledo
load cell

WinCC process
software
19" multi-touch screen

Uninterrupted
power supply UPS

Watson-Marlow
Variable speed peristaltic pump

Overlay gas supply gas

Pressure sensor

2x Exhaust gas filter

8x Feed line

4 x Sensor port

Macro + Micro sparger inlet

2 x weldable luer sampling
port

Temperature sensor

Harvest tube

DuoBioX® Pro Single-use Bioreactor

Tank and I/O Cabinet

Model	50 L	200 L	500 L	1,000 L	2,000 L
Max working volume	50 L	200 L	500 L	1,000 L	2,000 L
Min working volume	13 L	35 L	100 L	200 L	350 L
Jacket pressure resistant	Atmospheric pressure				
Temperature resistant	80℃				
Aspect ratio	2.25:1	1.6:1	1.5:1		
Jacket material	304SS				
Exhaust gas heating device	2				
Culture bag lifting device	none		inching with protection		
Blade	3 pitched blades				
Blade diameter	21.6 cm (8.5 in)		26.6 cm (10.5 in)	31.7 cm (12.5 in)	41.9 cm (16.5 in)
Impeller position	Directly below	15° lower side			
Standard gas sparger	2 μm×1	2 μm×2	20 μm×6 1.0 mm×2	20 μm×6	20 μm×8 Separate macro-sparge
	20 μm×1	20 μm×2		1.0 mm×2	
	0.5 mm×2	0.5 mm×2		Separate macro-sparge	
	1.0 mm×1	1.0 mm×2			
pH sensor	1 (2 for optional)	2			
DO sensor	1 (2 for optional)	2			
CO ₂ sensor	Optional				
Gas	Air, O ₂ , CO ₂ , N ₂				
MFC	5 as standard, can configure 6 th one as optional				
Built-in peristaltic pump	2x Watson Marlow 114D; 2x Watson Marlow 313D			2x Watson Marlow 313D; 2x Watson Marlow 520	
External peristaltic pump		Optional maximum 1			
Temperature Control Unit (TCU)	Standard LAUDA air-cooling VC1200 Heating 2.3 kw Cooling 1.2 kw		Standard LAUDA air-cooling VC5000 Heating 4.5 kw Cooling 5.0 kw	Standard LAUDA air-cooling VC10000 Heating 7.5 kw Cooling 10.0 kw	Standard LAUDA air-cooling VC10000 Heating 7.5 kw Cooling 10.0 kw
Weighing feet	3	4			
Gas source	Air 200kPa, O ₂ 200kPa, CO ₂ 200kPa, N ₂ 200kPa is optional. Use 1/4" or 1/2" air tube quick connection				
IO cabinet power supply	Supply through control cabinet				
TCU connection	TC50				
Dimension	1,140*1650*690 mm	1,340*760*1,910 mm	1,420*960*2,870 mm	1,650*1,088*2,846 mm	1,830*1,360*3,830 mm
Net weight	215 kg	260 kg	530 kg	940 kg	1,377 kg
Full load weight	265 kg	460 kg	1,030 kg	1,940 kg	3,377 kg

DuoBioX® Pro Single-use Bioreactor

Control Cabinet

Hardware	SIEMENS IPC477E
Dimension	550*960*1,350 mm
Weight	89 kg
Touch screen	19 inch (52.4mm) 10-point touch
UPS	Maintain sensor and data recording for 30 minutes
Software	SIEMENS WINCC
Compliance	21 CRF Part 11
Power	220V, ≤2kw (w/o TCU)

Temperature Control Unit (LAUDA)

Model	VC1200	VC1200	VC5000	VC10000
Power	220 v, 3 pins plug		380 v, Industrial power 5 pins plug	
Heating power	2.3 kw		4.5 kw	7.5 kw
Cooling power	1.2 kw		5.0 kw	10.0 kw
Dimension	450*550*650mm		550*650*970mm	650*670*1250mm
Minimum heat dissipation interval (front, back, left, and right)	20*20*20*20 cm		50*50*20*20 cm	
Net weight	54 kg	57 kg	98 kg	147 kg
Volume	15 L	15 L	33 L	64 L
Temperature control range	-20°C~80°C (When the temperature is lower than 5°C, antifreeze should be used as circulating water)			
Circulating water pressure	3.2 bar Max			
Circulating water flow rate	37 L/min			
Heat dissipation	Air/water cooling			
Working temperature	5 – 40 °C			
Working humidity	Max 80% @ 31 °C			



Stainless Steel Suspension Cell Culture Bioreactor

Duoning provides customized bioreactors with volume of >20 L for suspension cell culture, as well as supporting systems such as liquid mixing, inactivation and emulsification. In addition, we can provide customers with process design, pipeline construction, system integration, bioreactor design and manufacturing, control software development and other services.

Features:

- These systems can be used for suspension culture, microcarrier culture for monoclonal antibody, vaccine or protein-based therapeutics production, to achieve multiple use in one tank.
- Suspension and microcarrier culture using propulsion impeller or lifting impeller, low shear force, short mixing time, good mixing effect
- Deep microbubble direct air supply/bubble-free air supply device provide good oxygen transfer, meets the requirements of high-density cell culture, and reduces the damage to cells
- Using jacket and tank dual temperature PID control, temperature control is stable and accurate
- Sterilization-in-place sampling/sampling valve group to ensure safe, reliable and convenient operation
- Air intake/exhaust filter sterilization can be carried out independently to meet the requirements of filter replacement during the culture process
- CO₂/O₂/AIR flow rate adopts thermal mass flow controller, to realize the automatic feedback control of gas flow rate
- Dissolved oxygen control can adopt AIR/O₂ or AIR/O₂/N₂ mode. The DO control adopts unique PID control logic for stable and accurate control
- Deep sparger and overlay air supply adopt different control methods in sterilization process, to ensure thorough sterilization and no dead end
- Deep sparger uses a combination of hardware and software, effectively eliminating culture fluid reflux
- PH control adopts time judgment to avoid the simultaneous addition of CO₂ and base
- Peristaltic pump control allows external mobile peristaltic pump, easy to replace
- Pipeline and frame adopt open design, easy to use and maintain
- Pipeline adopts 3A standard, comply with GMP and BPE requirements
- Connection seal of the mixing impeller in the tank effectively avoids dead end and is easy to clean
- Pipeline construction is carried out in cleanroom to ensure welding quality
- Material inlet and tank bottom valves can be sterilized separately
- All the pipelines and tee connections on the tank body meet 3D requirements
- Dual mechanical seal, sterilization-in-place; or bottom magnetic stirring
- The control system adopts PLC control
- Servo motor, large torque, realizes stable and reliable work
- Powerful software functions, such as parameter setting, display control, test parameter, curve analysis, data storage, and output printing
- System adopts electronic signature, which meets the requirements of GMP audit



Stainless Steel Suspension Cell Culture Bioreactor

Technical Parameters				
Tank body	Total volume	40 L	75 L	150 L
	Working volume	30 L	50 L	120 L
	Diameter-height ratio	1:1.2	1:1.2	1:1.2
	Material	316L SS		
	Polishing rate	Internal: 0.2-0.4 μm ; external: 0.8 μm		
	Manufacturing standard	ASME, PED, GB D1/D2, ISO9001:2000		
		Material 316L stainless steel, jacket 304 stainless steel Polishing accuracy of the surface in contact with the material $Ra \leq 0.4$ Design pressure: 0.3 MPa, working pressure: 0.25 MPa Connection configuration: safety glass window, side view window, feed valve group port, foam sensor port, pressure sensor port, in-place sampling port, air intake port, bottom valve, inoculation valve group port, base feed port, safety bursting disc		
Stir	Type	Top/bottom stir, Dual mechanical or magnetic drive, PID control, clean air lubrication (mechanical seal)		
	Display	Digital display, ± 1 rpm		
	Stir speed	25~250 rpm, ± 1 rpm		
	Impeller	Plow type impeller		
Detection probe	pH	2~12, PID control, accuracy: ± 0.01 , correlate with base and CO_2		
	DO	0 ~ 200%, PID control, accuracy: $\pm 1\%$, correlate with O_2 , Air		
	Liquid level	SS probe, PID control		
	Temperature	Pt100, PID Control, Digital display, $\pm 0.1^\circ\text{C}$		
Gas control	Flowrate measurement	Thermal mass flow controller (optional)		
	Gas	Four-gas control system (N_2 , O_2 , CO_2 , Air), solenoid valve control		
	Intake filter	0.2 μm , PTFE		
	Exhaust filter	0.2 μm , PTFE		
	Exhaust condenser	316L SS		
	Pressure regulation	Automatic pressure regulating system, including pressure sensor, and regulating valve		
Liquid feed	Two peristaltic pumps	Variable speed pump, and flow is accumulated: regulate pump speed according to control requirement, thus control flow rate.		
Temperature	Control method	PID, Automatic sterilization; The temperature is controlled by the external heater and the cooling water under the control system		
	Control accuracy	Display accuracy: 0.1°C , control accuracy: $\pm 0.1^\circ\text{C}$		
	Control range	$5^\circ\text{C} \sim 65^\circ\text{C}$ above cooling water temperature		
Control system		Industrial programmable logic controller		
Optional configurations		Weighing, tank lid automatic lifting		
		AC380V two phase five wire, 15Kw		
Water, electricity, gas requirements		Cooling water pressure: 0.15 MPa		
		Cooling water temperature: not higher than 30°C		
		Input air pressure: 0.2 MPa (subject to drying and pre-filtration)		
		Input steam pressure: 0.18 MPa (must be pre-filtered)		

For more configuration information, please contact Duoning technical support team or your local Duoning representatives.

DuoBioX® Explore Series Multi-Parallel Bioreactor System – Microcarrier-based Cell Culture

DuoBioX® Explore is a state-of-the-art cell culture bioreactor system that boasts an innovative design, exceptional performance, comprehensive functionality, and user-friendly operation. Users can control one to eight glass tanks from a single computer, allowing them to operate independently or in parallel, significantly accelerating the process development timeline. The DuoBioX® Explore system is ideal for the development and research of cell culture processes within the biopharmaceutical industry.

Design Concept: The Explore system fully complies with the technical performance requirements for bioreactors in the biopharmaceutical industry. The process software employs a streamlined design language to facilitate easier operation. The controller features a complete set of high-quality electrical components from reputable brands, which are highly integrated to occupy less space, thereby conserving valuable laboratory benchtop space.

Material Construction: The stainless-steel part of the tank body that comes into contact with the liquid is constructed from SUS316L stainless steel, which has been electrolytically polished to create an inert surface that facilitates easy cleaning. The glass tank body is made from high-quality tempered borosilicate glass, while the sealing materials consist of EPDM, silicone, and other substances that comply with FDA standards. The non-liquid contact part is made from premium SUS304 stainless steel.



System Hardware: A complete set of high-end hardware is utilized to ensure stable and reliable equipment performance:

- Germany SIEMENS S-1200 series PLC
- Swiss METTLER TOLEDO pH gel electrode
- Swiss HAMILTON DO optical Sensor
- 316L Stainless steel bubble-free aeration screen
- Japan Panasonic servo stirring motor
- Japan SMC solenoid valve
- US Dwyer rotor flow meter
- US ALICAT mass flow meter

Main Applications: Microcarrier-based cell culture of various adherent dependent cells

- Vero cells
- MDCK cells
- MSC (Mesenchymal stem cells)
- Adherent dependent cells



Advantages:

- Various tank specifications are available, including 500 mL, 3 L, 7 L, and 15 L.
- The satellite chassis design offers significant flexibility for system expansion, enabling rapid implementation of multi-link or parallel control for one to eight tanks. The Explore system facilitates easy parameter settings, process program calls, and data backups between different tanks, while also allowing for the comparison and analysis of trends across various batches on a single interface.
- Powerful software functions can provide comprehensive control based on feedback, timing, conditions, and scripted recipes, effectively meeting the user's stringent process requirements.
- The operating system, developed on the WinCC industrial-grade architecture, complies with GMP and 21 CFR Part 11 regulations, making it suitable for use in the pharmaceutical and medical industries.
- A complete network communication interface that integrates with SCADA systems to facilitate data collection and remote monitoring.
- In addition to monitoring basic parameters such as DO, pH, temperature, liquid level, and stirring control, the system offers bubble-free aeration to prevent shear damage to cells caused by bubbles. This feature supports the perfusion culture process of microcarriers. Furthermore, the optimized exhaust gas cooling device effectively prevents the blockage of the exhaust gas filter, facilitating the high-density culture of adherent cells on microcarriers.
- The controller is equipped with two additional input interfaces that can be connected to sensors, such as those for cell density, CO₂ levels, and weighing. Furthermore, additional sensors can be integrated into the control feedback system.



DuoBioX® Explore Series Multi-Parallel Bioreactor System – Microcarrier-based Cell Culture

Model	Explore 500mL	Explore 3L	Explore 7L	Explore 15L
Function	Microcarrier-based culture, control 8 tanks as maximum			
Tank Body				
Working Volume	400 mL	2 L	5 L	10 L
Max. Volume	500 mL	3.1 L	6.8 L	15 L
Min. Working Volume	100 mL	0.6 L	1.5 L	3.2 L
Height-Diameter Ratio	2:1	1.9:1	2.2:1	2.0:1
Np Value	1.5			
Impeller	3 inclined blades 45°			
Impeller Diameter	35 mm	45 mm	60 mm	75 mm
Aeration Method	Bubble-free			
Perfusion	Yes			
Controller				
pH Sensor	Inpro3100i/SG/120	Inpro3100i/SG/225	Inpro3100i/SG/325	
DO Sensor	Optical Sensor			
CO ₂ Sensor	Optional			
Overlay Aeration	Rotor Flow Meter			
MFC-Air	0~0.1 L	0~0.5 L	0~1 L	0~2 L
MFC-O ₂	0~0.1 L	0~0.5 L	0~1 L	0~2 L
MFC-CO ₂	0~0.1 L	0~0.5 L		0~1 L
MFC-N ₂	Optional			
MFC-O ₂ Micro Sparger	0~0.1 Optional		0~0.5 Optional	0~1 Optional
Built-in Peristaltic Pump	4 x Variable speed pump			
Temperature Control	Electric heating base 100w Cold water solenoid valve	Electric heating blanket 400w Cold water solenoid valve		
Exhaust Cooling	No	Semiconductor or water cooling		
Weighting	Optional			
Control Software (Need to be installed on the user's computer)				
21 CFR Part 11	Yes			
Data Record	Yes			
User Authorization Management	4 levels			
Utilities Requirements				
Air Source	Air, O ₂ , CO ₂			
Air Source Pressure	0.2-0.3 MPa			
Control Cabinet Power Supply	220v 50Hz			
Power Socket	10A Three Holes			
Control Cabinet Dimension	Depth*Width*Height 554*188*404 mm			
External dimensions of a single tank Excluding exhaust condenser	Height*Diameter 357*100 mm	Height*Diameter 410*210 mm	Height*Diameter 520*250 mm	Height*Diameter 620*280 mm
Control Cabinet Net Weight	25 kg			
Tank Net Weight	2 kg	8 kg	11 kg	15 kg

DuoBioX® Explore Multi-Parallel Benchtop Glass Fermenter

DuoBioX® Explore is a state-of-the-art microbial fermentation system that boasts industry-leading design, exceptional performance, comprehensive functionality, and user-friendly operation. Users can control one to eight glass tanks with a single computer, allowing them to operate independently or in parallel, significantly accelerating the progress of process development. The DuoBioX® Explore system is ideal for the development and research of fermentation processes within the biopharmaceutical industry.

Design Concept: The DuoBioX® Explore system fully satisfies the technical performance requirements for microbial fermentation tanks in the biopharmaceutical industry. Its process software employs a user-friendly design language, simplifying operation. The controller features a complete set of electrical components from top-tier brands, which are highly integrated to minimize space usage, thus preserving valuable laboratory benchtop areas.



Material of Construction: The liquid-contact parts of the tank are constructed from SS 316L stainless steel, which has been electrolytically polished and treated with an inert surface for easy cleaning. The glass tank body is made of high-quality tempered borosilicate glass, while the sealing materials consist of EPDM, silicone, and other materials that comply with FDA requirements. The non-liquid contact parts are made from high-quality SS 304 stainless steel.

System Hardware: Adopt a full set of well-known brand hardware to ensure stable and reliable equipment performance:

- SIEMENS S-1200 PLC
- Panasonic servo motor
- METTLER TOLEDO pH gel electrode
- SMC solenoid valve
- HAMILTON DO optical electrode
- Dwyer rotor flow meter
- Prefluid variable speed peristaltic pump (Watson-Marlow as optional)
- ALICAT mass flow meter

Advantages:

- Multiple tank volume specifications to choose from, including 3 L, 5 L, 7 L, and 15 L.
- The satellite chassis design provides great flexibility for system expansion and allows rapid multi-link or parallel control of 1 to 8 tanks. The Explore system can easily realize parameter setting, process program call, and data backup between different tanks, and can compare and analyze trends of different batches on the same interface.
- Powerful software functions can achieve all-round control based on feedback, time, conditions and script recipes, meeting users' stringent process requirements.
- The operating system developed based on Wincc industrial-grade architecture complies with GMP and 21 CFR Part 11 requirements and can be used in industries such as pharmaceuticals and medical care.
- Perfect network communication interface can be connected to SCADA to achieve data acquisition and remote monitoring. The controller reserves additional analog input interfaces to integrate sensors such as CO₂/ weight/biomass and to involve external sensors in the control feedback. The system can be expanded to add exhaust gas analysis and online biochemical analysis functions.
- The system provides a variety of DoE method options, covering screening and optimization functions; the system software is embedded, and the experimental design can be assigned to the satellite tank seamlessly with one click; the result analysis is visualized and graphically output to determine the optimal range.

DuoBioX® Explore Multi-Parallel Benchtop Glass Fermenter

Model	Explore 3L-F	Explore 5L-F	Explore 7L-F	Explore 15L-F
Function	Microbial fermentation, controlling up to 8 tanks			
Tank (with baffle)				
Nominal volume	3 L	5 L	7 L	15 L
Max working volume	2.2 L	3.6 L	5.0 L	10.8 L
Min working volume	600 mL	1.2 L	1.7 L	3.6 L
Height-to-diameter ratio (H:D)	2:1	1.8:1	2.2:1	2:1
Impeller number	2		3	
Impeller type	6 straight blades x2		6 straight blades for middle and lower impeller x2, 6 45° inclined blade for upper impeller x1	
Blade diameter	65 mm	72 mm	72 mm	86 mm
Sparger tube diameter	4 mm	6 mm	8 mm	8 mm
Bottom sparger diameter	0.8 mm			
Number of sparger holes	8	8	8	16
Bottom sparger shape	Ring sparger			
Controller				
pH electrode	Inpro3100i/SG/225; EasyFerm Bio PHI Arc 225		Inpro3100i/SG/325; EasyFerm Bio PHI Arc 325	
DO electrode	243666-142/225 (Optical) H2		243666-142/325 (Optical) H2	
External interface reserved	1*4-20mA analog input (2 as optional)			
Overlay air supply	Air-rotor flowmeter			
MFC-Air	0~1 L	0~4 L	0~10 L	0~20 L
MFC-O ₂	0~1 L	0~4 L	0~10 L	0~20 L
MFC-CO ₂	Optional			
MFC-N ₂	Optional			
Liquid level electrode	Standard			
Peristaltic pump	4 x Prefluid KZ12 variable speed peristaltic pump (Waston Malow 114D as optional)			
Temp. control	Pt100 temperature electrode; electric blanket 100w; PID control cold water valve adjustment			
Exhaust condensation	Cooling water circulation			
Load cell	Optional			
Control software				
21 CFR Part 11	Yes			
Data log	Yes			
User authorization management	4 levels			
Utility requirement				
Air source	Air, O ₂ , CO ₂ , N ₂			
Air source pressure	0.2-0.3 MPa			
Voltage	220v 50 Hz			
Socket	10A three-hole			
Control cabinet dimension	Length*Width*Height: 554*188*404 mm			
Tank external dimensions	Height * Diameter (External) 431*200 mm	Height * Diameter (External) 480*250 mm	Height * Diameter (External) 550*250 mm	Height * Diameter (External) 662*340 mm
I/O cabinet weight	45 kg			
Tank net weight	8 kg	10 kg	12 kg	15 kg

DuoBioX® Elite Benchtop Fermenter

DuoBioX® Elite is a benchtop fermentation system that supports dual culture modes. Users can quickly establish and develop microbial fermentation processes ranging from 3 to 15 liters with this system, achieving process establishment, development, and optimization with a highly cost-effective investment. The DuoBioX® Elite system is ideal for the early development of fermentation processes in scientific research institutions or the biopharmaceutical industry.

Design Concept: The Elite system fully complies with the technical performance requirements of fermenters in the biopharmaceutical industry. The process software employs a user-friendly design language to facilitate easier operation. The controller features a complete set of high-quality, highly integrated electrical components that occupy minimal space, thereby conserving valuable laboratory benchtop area.

Material of Construction: The stainless-steel parts of the tank body that comes into contact with the liquid is constructed from SUS316L stainless steel and is electropolished to create an inert surface that is easy to clean. The glass tank body is made of high-quality tempered borosilicate glass, while the sealing materials consist of EPDM, silicone, and other substances that comply with FDA requirements. The non-liquid contact parts are made from high-quality SUS304 stainless steel.

Advantages:

- Various tank specifications are available, including 3L, 5L, 7L, 15L and more.
- The software is powerful and capable of comprehensive control based on feedback, time, conditions, and script recipes, effectively meeting the user's stringent process requirements.
- The operating system, developed on the WinCC industrial-grade architecture, complies with GMP and 21 CFR Part 11 regulations, making it suitable for use in industries such as pharmaceuticals and medical devices. The integrated touch HMI kit allows for real-time control of process parameters.
- In addition to DO, pH, temperature, liquid level, and stirring control units, users can implement more flexible and variable ventilation strategies to effectively support high-density fermentation and cultivation processes. The optimized cooling coil device enables efficient and precise temperature control using a cooling water medium.
- The controller is designed with additional input interfaces to connect various sensors, including those for biomass measurement, weighing, and exhaust analysis. Furthermore, additional sensors can be integrated into the control feedback system.



Stainless Steel Microbial Fermentation System

Technical Parameters					
Tank body	Total volume	15 L	30 L	50 L	100 L
	Working volume	10 L	8-22 L	15-35 L	25 – 72 L
	Diameter-height ratio	1:2.2	1:2.2	1:2.2	1:2.2
	Material	316L SS			
	Head plate	316L SS, 4 pieces			
	Manufacturing standard	ASME, PED, GB D1/D2, ISO9001:2000 Material 316L stainless steel; Jacket 304 stainless steel Polishing accuracy of the surface in contact with the material Ra<0.4 Design pressure: 0.3 MPa, working pressure: 0.25 MPa Connection configuration: safety glass window, side view window, feed valve group port, foam sensor port, pressure sensor port, in-place sampling port, air intake port, bottom valve, inoculation valve group port, base feed port, safety bursting disc			
Stir	Type	Top stir, mechanical seal, PID control			
	Display	Digital display, ± 1 rpm			
	Stir speed	25~800 rpm, ± 1 rpm			
	Impeller	Six-blade impeller			
Detection probe	pH	2~12, PID control, accuracy: ± 0.01 , correlate with base and acid feed pump			
	DO	0 ~ 200%, PID control, accuracy: $\pm 1\%$, correlate with gas supply flow rate and stir speed (optional)			
	Liquid level	SS probe, PID control			
	Temperature	Pt100, PID Control, Digital display, $\pm 0.1^{\circ}\text{C}$			
Gas control	Flowrate measurement	Thermal mass flow controller (optional)			
	Gas	Four-gas control system (N_2 , O_2 , CO_2 , Air), solenoid valve control			
	Intake filter	0.2 μm , PTFE			
	Exhaust filter	0.2 μm , PTFE			
	Exhaust condenser	316L SS			
	Pressure regulation	Automatic pressure regulating system, including pressure sensor, and regulating valve			
Liquid feed	Peristaltic pump	Variable speed pump, and flow is accumulated,			
Temperature	Control method	PID, Automatic sterilization; The temperature is controlled by the external heater and the cooling water under the control of the control system			
	Control accuracy	Display accuracy: 0.1°C , control accuracy: $\pm 0.1^{\circ}\text{C}$			
	Control range	$5^{\circ}\text{C} \sim 65^{\circ}\text{C}$ above cooling water temperature			
Control system		Siemens programmable logic controllers for industrial use			
Optional configurations		Weighing, tank lid automatic lifting			
Water, electricity, gas requirements		Cooling water pressure: 0.15MPa			
		Cooling water temperature: not higher than 30°C			
		Input air pressure: 0.2MPa (subject to drying and pre-filtration)			
		Input steam pressure: 0.18MPa (must be pre-filtered)			

For more configuration information, please contact Duoning Technical Support team or your local Duoning sales representatives.

Cell Culture Flasks

Duoning cell culture flasks are manufactured with excellent and rigorous process, ensures the smooth body of the flasks, and reduces the risk of foaming during culture. Duoning cell culture flasks have multiple uses, including cultivating mammalian cells (CHO cells, HEK 293 cells) for recombinant protein production. Excellent product design can greatly improve the efficiency of oxygen transfer inside the flask itself, thereby providing a better growth environment for cells. Duoning cell culture flasks can be used with other cell culture equipment and consumables produced by Duoning, including carbon dioxide incubators with shakers and bioreactors.

Aseptic Transfer Cap

Duoning aseptic transfer caps are used for aseptic transfer during the expansion of suspension cells, effectively reducing the risk of contamination. The aseptic transfer cap consists of two ports: The vent port is connected to a 0.2 μ m air filter; The inner end of the liquid delivery port is connected to a chemically resistant hard tube immersed in the bottom part of the flask, and the outer side is connected to a 1/8"-1/4" thermoplastic tube.



Advantages:

Product Benefits of Cell Culture Flasks

- Meet regulations of USP6
- Blow-injection molding, avoiding surface scars
- Excellent chemical resistance, can withstand a variety of chemicals
- Good transparency, clear scale, easy to observe
- Flask neck sizes conform to the international SBS standard, suitable for quick connection of bioreactors

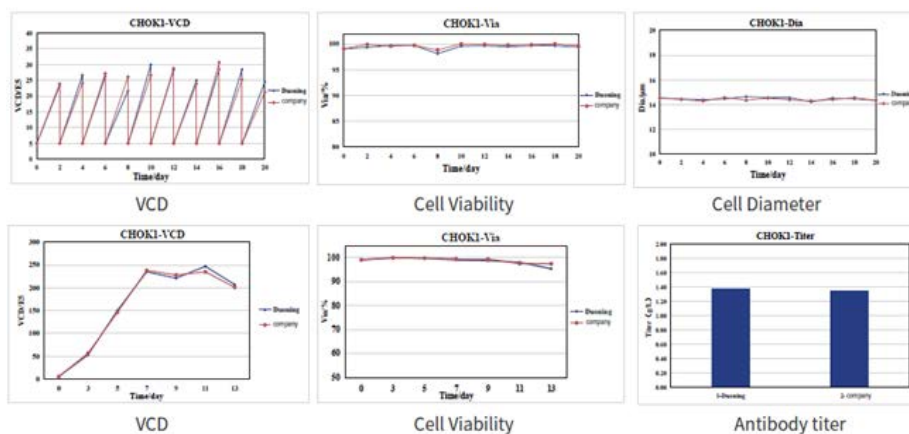


Product Benefits of 2.8 L & 5 L Cell Culture Flasks

- Equipped with a 0.2 μ m air-permeable cap, which can better mix the cells and the culture media, increase the air permeability, and enable the cells to grow to higher density.
- The handle design of the 5 L culture flask is easy to pick up, avoiding the risk of contamination caused by the customer's hand being too close to the flask neck during use.
- The bottom of the 2.8 L culture bottle is optimized, which saves space, greatly improves the utilization rate of the incubator, and reduces customer R&D and production costs.
- Duoning cell culture flask adopts extrusion blowing technology, the flask body is smooth, which reduces the risk of cell adhesion and media foaming.
- Duoning cell culture flasks are sterilized by cobalt 60 radiation, and the aseptic independent packaging is convenient for use.

Product Benefits of Aseptic Transfer Cap

- Compatible with Duoning 2.8 L & 5 L culture flasks;
- Double-layer independent aseptic packaging;
- Disposable, ready-to-use.



Test data: CHOK1 cell growth results after 10x passages

Cell Culture Flasks

Culture Parameter Recommendation

Cell Type	Size	Recommended Max Capacity (mL)	Max Speed (rpm)	Shaker Track Specification (mm)
CHO-S	125 mL	30	130	25
	250 mL	60	130	25
	500 mL	150	130	25
	1,000 mL	350	130	25
	2,800 mL	800	90	25
	5,000 mL	2,500	90	25
HEK	125 mL	30	130	15
SF9	125 mL	30	130	15
	500 mL	200	150	31.75
	1,000 mL	300	120-150	31.75
	2,800 mL	1,000	100-150	31.75
	5,000 mL	3,500	90-100	31.75

Volume	Optimal Working Volume	Effective Volume	Optimal Speed	Suggested Speed Range
125 mL	25 – 30 mL	8 - 35 mL	110	90 - 110
250 mL	60 mL	36 – 100 mL		
500 mL	100 mL	50 – 200 mL		
1,000 mL	200 mL	101 – 400 mL		
2.8 L	1.4 L	0.9 – 1.6 L		
5 L	2 L	1.7 – 3.2 L	90	

Note: Duoning culture flask specification only

Specification:

Cell Culture Flask

Part No.	Volume	Type	Height	Neck Diameter	Bottom Diameter	Sterilization	Pcs/Pack	Pcs/Box
DNFL02010125	125 mL	PETG	113.5 mm	34 mm	66 mm	Yes	1	24
DNFL02010250	250 mL		138.2 mm	34 mm	83 mm			12
DNFL02010500	500 mL		177.5 mm	39 mm	101 mm			12
DNFL02011000	1,000 mL		211.5 mm	39 mm	127 mm			6
DNFL02032800	2.8 L	K-Resin	243.3 mm	96.2 mm	164 mm			6
03-5000	5 L, 4 pcs		253.2 mm	96.2 mm	228 mm			4
DNFL02020125	125 mL	PC	113.5 mm	34 mm	66 mm			24
DNFL02020250	250 mL		138.2 mm	34 mm	83 mm			12
DNFL02020500	500 mL		177.5 mm	39 mm	101 mm			12
DNFL02021000	1,000 mL		211.5 mm	39 mm	127 mm			6

Aseptic Transfer Cap

Part No.	Sterilization	Pcs/pack	Pcs/box
DNTC020106P	Yes	1	10

AU200 Bioprocess Analyzer

- Various parameters, freely selectable
- Suitable for monitoring most culture processes



Efficient and Stable Reaction Unit

50 semi-permanent UV-transparent hard cuvettes
Static reaction tray with direct heating and constant temperature design



Multi-Functional Sample and Reagent Unit

Reagent tray cooled by semiconductor Peltier, ensuring quality.
40 reagent positions, supporting single or double reagents, plug-and-play.
40 sample positions, compatible with various EP tubes and sample cups.



High-Precision Micro Pipetting Unit

Original high precision integrated ceramic sampler from the USA, digitally controlled stepper motor for optimized performance, quiet and eco-friendly, with accurate dosing.
Original high-precision sampling needle from Japan, with nano-polished inner and outer walls. Features include liquid level detection, volume tracking, and 3D collision avoidance intelligent functions.



Perfect Cross-Contamination Prevention Solution

Nano-polished stirring system to ensure thorough reactions
High-performance cleaning workstation with 6 stages and 18 automatic steps per cycle

Easy-to-Operate, Powerful Control System

Supports automatic sample dilution and automatic calibration dilution
Real-time monitoring of sample tray, reagent tray, reaction tray, deionized water, and waste status, with comprehensive alarm functions
Comply with audit trail and data integrity requirements

Precision and Stable Fluidic System

World-renowned brand fluidic components: IWAKI liquid pump, SMC solenoid valves, IDEX ceramic integrated syringe, THOMAS peristaltic dosing pump, Tygon fluid tubing, CPC quick connectors.



Advanced and Unique Post-Dispersion System

Fully enclosed photoelectric array post-dispersion system, maintenance-free for life.
Dual-wavelength detection to eliminate sample interference.
Original German UV halogen tungsten lamp with a lifespan of up to 2000 hours.



Detection Parameter Menu

Substrates / Analytes	Metabolites	Products
Glucose, Sucrose, Glutamine, Glutamic Acid, Glycerol, Pyruvate, Cholesterol, Potassium Ion (K^+), Sodium Ion (Na^+), Calcium Ion (Ca^{2+}), Magnesium Ion (Mg^{2+}), Copper Ion (Cu^{2+}), Zinc Ion (Zn^{2+}), Phosphate (PO_4^{3-}), Carbon Dioxide (CO_2), Urea, Methanol	Lactic Acid, Ammonia, Lactate Dehydrogenase (LDH), Ethanol, Formic Acid, Acetic Acid, Osmolality (calculated)	Human IgG, Mouse IgG, Total Protein, Albumin, Type IV Collagen

More Detection Parameters Coming Soon...



AU200 Bioprocess Analyzer

Instrument Specifications

	Parameter	Specification
Overall Performance	Instrument Type	Fully Automatic Bioprocess Analyzer
	Testing Principle	Spectrophotometry
	Testing Speed	160+ tests/hour, maximum speed 200 tests/hour
	Simultaneous Test Items	40 (single reagent) / 20 (dual reagent)
	Simultaneous Samples	40
	Test Sequence	Continuous loading; additional samples can be added during operation
	Testing Methods	Endpoint method, kinetic method, two-point method
	Minimum Reaction Volume	150 μ L
	Maximum Reaction Volume	500 μ L
	Water Consumption	$\leq$ 5 L/hour
Sample / Reagent / Stirring Rod Unit	Sample Volume	2–50 μ L
	Sample Tray	Rotary type, 40 sample positions
	Sample Tubes	Compatible with various types: EP tubes, micro cups, plastic tubes
	Sample/Reagent Needle	Combined needle for sample and reagent; features liquid level detection, 3D collision avoidance, volume tracking, and real-time reagent level detection
	Reagent Tray	Rotary type, 40 reagent positions (inner and outer rings); semiconductor cooling with water circulation, continuous 4–12°C refrigeration for 24 hours
	Reagent Bottles	50T, 100T
	Stirring Rod	Independent stirring rod with nano-polished finish
	Reagent Volume	R1: 150–450 μ L, R2: 10–300 μ L
Reaction Plate Unit	Reaction Cups	50 semi-permanent UV-transparent hard cuvettes
	Reaction Cup Cleaning	6-stage, 18-step automatic cleaning
	Reaction Temperature	Accuracy $37 \pm 0.2^{\circ}\text{C}$, fluctuation $< \pm 0.1^{\circ}\text{C}$
	Temperature Control Method	Solid direct heating
Optical System	Light Source	Halogen tungsten lamp, 12V 20W, liquid water circulation cooling, long lifespan $\geq$ 2000 hours
	Spectral Method	Fully enclosed photodiode array post-dispersion system
	Wavelength Range	340, 405, 450, 510, 546, 578, 630, 670 nm (8 wavelengths)
	Detector	Photodiode detector array
	Resolution	0.0001 Abs
	Linear Range	0–3.5 Abs
	Absorbance Accuracy	0.5A: $< \pm 0.02$ Abs, 1.0A: $< \pm 0.04$ Abs
	Absorbance Stability	< 0.01 Abs
	Absorbance Repeatability	$< 1.5\%$
	Wavelength Accuracy	$< \pm 2$ nm

AU200 Bioprocess Analyzer

Instrument Specifications

	Parameter	Specification
Calibration and Quality Control	Calibration Methods	Single-point, two-point, multi-point linear calibration; nonlinear Logit-4P, Logit-5P, spline, exponential, polynomial calibration
	Calibration Curve	Automatically records calibration curves
	QC Chart	QC chart recording, real-time QC status monitoring
	Out-of-Control Handling	Automatic alarm for out-of-control items and rules, records raw data and analysis of cause
	QC Rules	Westgard multi-rules, cumulative sum rules, Twin Plot rules
Operating System	Operating System	Windows 10 or above
	Data Storage	Stored on computer host hard drive
	LIS Function	Integrated bi-directional LIS functionality, seamlessly connects with professional management software
	Print Content	Customizable print content
	Print Format	Provides multiple common formats, fully customizable
	Status Monitoring	Real-time monitoring of sample tray, reagent tray, reaction tray, and QC status; cuvette status monitoring with automatic skip of defective cuvettes; lamp status monitoring; pressure and temperature monitoring; reagent volume, real-time reaction curves, linear limit, substrate depletion check, pre-band detection; real-time alerts for abnormal status
	Audit Trail / Data Integrity	User authorizations fully configurable; compliant with 21 CFR Part 11; data records cannot be modified or deleted
	Other Functions	Combination projects, calculation/manual projects, cross-contamination prevention; automatic subtraction of sample and reagent blanks; automatic fault recovery; automatic printing and data statistics
Others	Host Dimensions (LxDxH mm)	720 × 450 × 550
	Power Supply	AC 100-240V~, 50/60Hz ±1Hz
	Power Consumption	Maximum 350 VA
	Net Weight	50 Kg
	Standard Configuration	Analyzer main unit, accessory box, computer (can be upgraded to touchscreen, no external PC needed)
	Optional Accessories	Printer

AU400 Bioprocess Analyzer

- High Throughput and Fast Detection
- Ideal for Processing Large Volumes of Samples

High-Efficiency, Stable Reaction Unit



81 semi-permanent UV-transparent rigid cuvettes ensure accurate absorbance measurements

Multi-Functional Sample and Reagent Unit



Reagent tray with semiconductor Peltier cooling ensures quality
40 reagent positions; supports single or dual reagents, plug-and-play
40 sample positions; compatible with various EP tubes and sample cups

High-Precision Micro Pipetting Unit



Original high-precision ceramic integrated sampler from the USA, optimized digital stepper motor control, quiet and eco-friendly, ensuring accurate dispensing
Original high-precision sampling needle from Japan with nano-polished inner and outer walls; features liquid level detection, real-time volume tracking, and 3D anti-collision intelligent functions

Perfect Cross-Contamination Prevention Solution



Nano-polished high-precision stirring system ensures thorough reactions
Powerful cleaning workstation with 6-stage, 18-step automatic cleaning per cycle

User-Friendly, Powerful Control System

Controlled via laptop (or optional 22-inch flat touchscreen)
Supports automatic sample and calibration dilutions
Real-time monitoring of sample tray, reagent tray, reaction tray, deionized water, and waste; comprehensive alert functions
Compliant with audit trail and data integrity requirements

Precision and Stable Fluidics System

High-quality components from globally recognized brands: IWAKE liquid pump, SMC solenoid valves, IDEX ceramic integrated syringe, THOMAS peristaltic pump, Tygon fluidic tubing, CPC quick connectors



Advanced and Unique Post-Dispersion System

Fully enclosed photodiode array post-dispersion system, maintenance-free for life
Dual-wavelength detection to eliminate sample interference
Original German UV halogen-tungsten lamp with a lifespan of up to 2000 hours



Detection Parameter Menu

Substrates / Analytes	Metabolites	Products
Glucose, Sucrose, Glutamine, Glutamic Acid, Glycerol, Pyruvate, Cholesterol, Potassium Ion (K^+), Sodium Ion (Na^+), Calcium Ion (Ca^{2+}), Magnesium Ion (Mg^{2+}), Copper Ion (Cu^{2+}), Zinc Ion (Zn^{2+}), Phosphate (PO_4^{3-}), Carbon Dioxide (CO_2), Urea, Methanol	Lactic Acid, Ammonia, Lactate Dehydrogenase (LDH), Ethanol, Formic Acid, Acetic Acid, Osmolality (calculated)	Human IgG, Mouse IgG, Total Protein, Albumin, Type IV Collagen

More Detection Parameters Coming Soon...



AU400 Bioprocess Analyzer

Instrument Specifications

	Parameter	Specification
Overall Performance	Instrument Category	Fully Automated Bioprocess Analyzer
	Test Principle	Spectrophotometry
	Test Throughput	300+ tests/hour, up to 400 tests/hour
	Simultaneous Assays	40 (single reagent) / 20 (dual reagent)
	Simultaneous Samples	40
	Test Sequence	Continuous loading; additional samples can be added during operation
	Test Methods	End-point, Kinetic, Two-point
Sample / Reagent / Stirring Unit	Sample Volume	2–50 μ L
	Sample Tray	Circular tray, 40 sample positions
	Sample Tubes	Compatible with various EP tubes, microcups, plastic test tubes, etc.
	Sample/Reagent/Stirring Unit	Shared probe for sample and reagent; features liquid level detection, 3D anti-collision, real-time volume tracking, and reagent residual monitoring
	Reagent Tray	Circular tray with 40 reagent positions (inner and outer rings); semiconductor cooling with water circulation; continuous 24-hour refrigeration at 4–12 $^{\circ}$ C
	Reagent Bottles	50T, 100T
	Stirring Rod	Independent stirring rod with nano-polished finish
Reaction Plate Unit	Reaction Cuvettes	81 semi-permanent, special UV-transparent rigid cuvettes
	Cuvette Cleaning	6-stage, 18-step automatic cleaning
	Reaction Temperature	Accuracy: 37 ± 0.2 $^{\circ}$ C; Fluctuation: $< \pm 0.1$ $^{\circ}$ C
	Temperature Control	Solid direct heating
Optical System	Light Source	Halogen-tungsten lamp, 12V 20W; liquid water circulation cooling; long service life $\geq$ 2000 hours
	Spectral System	Fully enclosed photodiode array post-dispersion system
	Wavelength Range	340, 405, 450, 510, 546, 578, 630, 670 nm (8 wavelengths)
	Detector	Photodiode array detector
Calibration and Quality Control	Calibration Methods	Single-point, Two-point, Multi-point linear; Non-linear: Logit-4P, Logit-5P, Spline, Exponential, Polynomial
	Calibration Curve	Automatic recording of calibration curves
	QC Chart	QC chart recording with real-time QC status monitoring
	Out-of-Control Handling	Automatic alert for out-of-control items and rules; records raw data and analyzes causes of OOC events

AU3X Portable Bioprocess Analyzer

Instrument Specifications

Technical Specification	
Display	10-inch color LCD
Keyboard	Touch screen
Dimensions	387 mm (L) × 293 mm (W) × 379 mm (H)
I/O	USB × 2, Ethernet × 1
Weight	4 ± 1 kg
Power Supply	Voltage: AC 100V–240V Frequency: 50/60 Hz Input Current: 5 A
Operating Temperature	10°C – 40°C
Relative Humidity	≤ 80%
Storage Conditions	Dry, clean, level placement; avoid direct sunlight
Performance Specifications	
Maximum Number of Samples	3
Maximum Simultaneous Tests	12
Detection Speed	≤ 15 min/sample
Minimum Sample Volume	10 µL
Wavelength Range	340–800 nm
Absorbance Stability	Variation ≤ 0.01
Absorbance Repeatability	Coefficient of Variation (CV) ≤ 1.5%
Audit Trail / Data Integrity	
Data Storage	100,000 records
User Authorizations	Three levels
Alarm Records	Alarm records cannot be modified or deleted
Audit Trail	Compliant with 21 CFR Part 11
Product Configuration	
Operating Software	Standard Chinese
User Manual / Maintenance Manual	Chinese
Labels / Stickers, Product Packaging	Chinese
External Devices	Supports external mouse, keyboard, printer
Network Connection	Wi-Fi, 4G, LAN port

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