

# FMT SERIES BOIREACTORE



Simple, easy to use, compact, and extensible

Environmental management system: ISO14001

Medical devices quality management system: ISO1348

Shuoboda Instruments (Hunan) Co., Ltd



An ISO9001:2015 certificate company

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# 1. FMT-L series Laboratory Small Classic Glass Bioreactor Fermenter, 1L To 15L




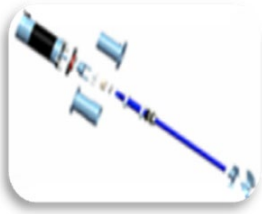


FMT-L series Laboratory Glass Fermenter Bioreactor is a fermentation unit for laboratory research that can be used to culture microorganisms or bacteria. The device can be set up by executing the user-defined parameter settings specified in the menu. The measurement and control system allows online measurement, control and evaluation of process parameters (e.g. temperature, pH and dissolved oxygen values) and independent monitoring of microorganisms or bacteria in each culture tank.

## BASIC INFORMATION

- Series: FMT-L series
- Tank volume: 3L, 5L, 10L, 15L
- Heating method: insulation blanket electric heating method
- Control system: SD-Control control system

## FEATURES

	<p><b>Excellent, sophisticated design brings the industry's most outstanding tank system</b></p> <ul style="list-style-type: none"> <li>• Abandon the thread design, the maximum load can reduce the thickness of the can lid, reaching an amazing 6mm</li> <li>• The opening adopts modular quick release design to reduce dead angle and eliminate bacteria</li> <li>• Adapt to multi-brand monitoring equipment, post-modification and maintenance can be realized through conversion parts</li> </ul>
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	<p><b>Advanced mixing system eliminates tank contamination</b></p> <ul style="list-style-type: none"> <li>• High-quality mechanical seals eliminate a trace of pollution from machinery</li> <li>• 1000+ times of mixing and balancing test to make the stirring stable and controllable</li> <li>• The self-developed coupling realizes quick loading and quick release of the motor, which is convenient and simple</li> </ul>
	<p><b>The best FMT-controller design ever since</b></p> <ul style="list-style-type: none"> <li>• Simple, easy to use, and scalable</li> <li>• Industry's smallest volume FMT-controller, L*W*H 410*215*435</li> <li>• Equipped with a 7.0-inch capacitive touch screen, multi-touch, can be connected to the computer control section to achieve joint control</li> <li>• Equipped with a common quick release interface, 3 peristaltic pumps, support for external expansion</li> <li>• Built-in SD-Control control software for online monitoring, recording, and curve display</li> <li>• Remote control with computer configuration software SD-Control</li> </ul>
	<p><b>From the core technology of Germany, a strong R &amp; D team</b></p> <ul style="list-style-type: none"> <li>• The core R&amp;D team comes from the German company fermenter team, stable and reliable technical support</li> <li>• Strong corporate philosophy to support the excellence of our products</li> <li>• Product design is comparable to imported fermentation tanks such as NBS and Applikon</li> <li>• R &amp; D team experienced 4000L bioreactor design experience</li> </ul>

**Taiwan origin 7" capacitive touch screen**  
User-friendly interface at a glance

**Siemens PLC  
Schneider electric**  
Stable and efficient

**U.S. Dwyer flow meter  
Sartorius inlet/outlet filter**

**Quality peristaltic pump**  
Three pumps for acid base, feeding and defoaming



**Serve Stirring Motor**  
Speed up to 1200rpm

**Mettler Toledo electrodes**  
Used Mettler pH/DO electrodes  
Mettler ORP electrodes can be chosen

**Excellent metal processing**  
Multi and extra ports to extend function

**Various stirring paddles**  
Fitted with 2 pcs of paddles

**Autoclavable glass tank**  
Jacket tank can be chosen



## SPECIFICATIONS

No.	Item	Specifications
1.	Tank body	<ul style="list-style-type: none"> <li>3L, 5L, 10L, 15L optional</li> <li>Max liquid load capacity: 80%</li> <li>Design pressure: Max 0.2Mpa</li> <li>Material: tank: high temperature borosilicate glass, can lid: AISI 316L stainless steel</li> </ul>
2.	Mixing system	<ul style="list-style-type: none"> <li>High-precision brushless AC servo motor, special mechanical seal</li> <li>Speed: 0 ~ 1200 rpm <math>\pm</math> 1 rpm</li> <li>Fifteen-stage speed regulation, the program sets the required speed at each stage, professionally builds</li> <li>Special mixing paddle: single layer inclined blade mixing paddle, flat blade mixing paddle, can replace the specified mixing paddle</li> </ul>
3.	Intake system	<ul style="list-style-type: none"> <li>Intake: air, quick release structure</li> <li>Imported US DYAIR brand glass rotor flowmeter, optional electromagnetic flowmeter</li> <li>Annular gas distributor</li> </ul>
4.	pH	<ul style="list-style-type: none"> <li>Range: 2.00 to 12.00 pH</li> <li>Accuracy: <math>\pm</math>0.02</li> <li>Ambient temperature Operating temperature: 0 ~ 100°C</li> <li>Sterilization temperature: 0 ~ 130 ° C</li> <li>Control: SD-K integrated transmitter</li> </ul>
5.	DO2	<ul style="list-style-type: none"> <li>Range: 0 to 200%</li> <li>Accuracy: <math>\pm</math>0.1%</li> <li>Ambient temperature Operating temperature: 0 ~ 100°C</li> <li>Sterilization temperature: 0 ~ 130 ° C</li> <li>Control: SD-K integrated transmitter</li> </ul>
6.	Temperature Control System	<ul style="list-style-type: none"> <li>Insulation blanket electric heating method, water bath temperature control mode optional</li> <li>Heating power: 300W 24V safe voltage</li> <li>Temperature control range: Cooling water temperature +5-65°C</li> <li>Temperature sensor: PT100 platinum electrode (high temperature quick release form)</li> </ul>
7.	Peristaltic pump	<ul style="list-style-type: none"> <li>ANTI-FOAM/FEED/ACID-BASE 3 peristaltic pumps</li> <li>LONGER original variable speed peristaltic pump</li> <li>Control can be set to ml/min, or 0 to 100% proportional control</li> </ul>
8.	Defoaming system	<ul style="list-style-type: none"> <li>Mechanical defoaming paddle: compression mechanical defoaming pulp with rake.</li> <li>Defoamer: peristaltic pump flow added</li> <li>Highly sensitive defoaming electrode</li> </ul>
9.	sampling	<ul style="list-style-type: none"> <li>Sterile sampling system, can be autoclaved</li> <li>Syringe negative pressure design, get rid of the distress of the bacteria in the sampling process</li> <li>Dual design, users can also use traditional flame inoculation methods</li> </ul>
10.	FMT controller, SD-Control software	<ul style="list-style-type: none"> <li>7-inch advanced capacitive touch screen, multi-touch operation</li> <li>Controller: Original Siemens PLC controller</li> <li>All parameters are displayed, controlled and edited online</li> <li>Rpm, T, pH, DO2 curve display function, historical data recording and export</li> <li>Software modularity: powerful software modular design supports user customization, and can be customized according to user-specified requirements.</li> </ul>
11.	power supply	<ul style="list-style-type: none"> <li>AC110~240v/0.8kw</li> </ul>
12.	Dimensions	Hbst: 250mm*465mm*500mm (length*width*height)

## MODEL SELECTION TABLE

MODEL	FMT-3L	FMT-5L	FMT-10L	FMT-15L
Working volume	1.2~2.4 L	2~4 L	4~8 L	8~12 L
Borosilicate glass + 316L stainless steel	•	•	•	•
Mechanical stirring	•	•	•	•
Off-site sterilization	•	•	•	•
Heating blanket temperature control	•	•	•	•
Intake	Air	Air	Air	Air
temperature	R+C+P+MC	R+C+P+MC	R+C+P+MC	R+C+P+MC
Stir	R+C+P+MC	R+C+P+MC	R+C+P+MC	R+C+P+MC
pH	R+C+P+MC	R+C+P+MC	R+C+P+MC	R+C+P+MC
Defoaming	R+C+P+MC	R+C+P+MC	R+C+P+MC	R+C+P+MC
Ventilation	MC	MC	MC	MC
Tank pressure	MC	MC	MC	MC
DO2	R+C+P	R+C+P	R+C+P	R+C+P
Feeding	MC+P	MC+P	MC+P	MC+P
Touch screen console	•	•	•	•
SD-Control control system	•	•	•	•

R-Detection    C-Automatic Control    P-Program Control    MC-Manual Control    • Standard

## CONFIGURATION

No.	name	Model and description
1	FMT controller	Standard configuration: touch screen with embedded control software, gas mixer, flow meter, pH, DO2 electrode, temperature electrode, 3 peristaltic pumps and other accessories
2	3L glass kit	Standard configuration: AC motor, can lid and accessories, mixing system, 3L glass tank, heating accessories
3	5L glass kit	Standard configuration: AC motor, can lid and accessories, mixing system, 5L glass





		tank, heating accessories
4	10L glass kit	Standard configuration: AC motor, can lid and accessories, mixing system, 10L glass tank, heating accessories
5	15L glass kit	Standard configuration: AC motor, can lid and accessories, mixing system, 15L glass tank, heating accessories
6	Air compressor	Silent oil-free air compressor



## KEY COMPONENT BRANDS

No	Name	Brand
1	pH sensor	Switzerland HAMILTON
2	DO2 sensor	Switzerland HAMILTON
3	pH, DO2 signal line	Switzerland HAMILTON
4	Controller	Germany Siemens PLC SMART-200 series
5	touch screen	PID program controls independent intellectual property rights
6	Machinery Seal	United Kingdom JOHN CRANE
7	Peristaltic pump	LONGER original peristaltic pump
8	Feed bottle	Germany SCHOTT
9	Glass rotor flowmeter	United State DYAIR

## OPTIONAL ACCESSORIES

In order to let users better use our fermenter, we have developed a wide range of high-quality accessories for users to meet the needs of users in different industries and different conditions, users can choose the relevant accessories according to their own situation.

SN	Name	Pictures	Description
FMT0001	Computer client SD-Control		Communication process, stable, reliable, efficient and fast Equipped with computer configuration software SD-Control control software to provide advanced process control Support remote control, complex process control, integrated data and information management Full monitoring, display, 100% error free, zero delay
FMT0002	High-precision circulating water machine B-Pelt 112 series		Peltier effect cooling Save water, the entire temperature control process only needs to cycle water volume Temperature range: 5 °C ~ 75 °C Accuracy ±0.1 °C

<p><b>FMT0003</b></p>	<p>Exhaust gas analyzer B-Gas 1.0 series</p>		<p>CO2: Non-dispersive infrared (NDIR) method                  O2: electrochemical method                  Resolution ±0.01%</p>
<p><b>FMT0004</b></p>	<p>Laptop (dedicated)</p>		<p>Model: ThinkPad X260                  Configuration: 12.5-inch screen, i5-6200U                  8GB 192GB solid state drive                  Pre-installed SDS-Control control software for remote operation of fermenter                  Wireless network control module required</p>



## 2. FMT-E Series Lab Advance Glass Bioreactor Fermenter, 1L To 15L, 4 Peristaltic Pumps

### DESCRIPTION

FMT-E series advanced fermenter is a flagship fermenter system developed by Shuoboda for professional laboratory users. Standard imported thermal mass flow meter MFC, automatic ventilation, main control and communication using bus mode. FMT-E has powerful computing power, stable operation ability, high scalability, and can be connected to external weighing balance, exhaust gas analysis, ORP, biomass analysis, etc. It is a product that is deeply used by laboratory fermentation users.

FMT-E series fermenter also undertakes the latest generation of research and development tasks of Shuoboda: launch the same type of controller suitable for fermenters of various imported brands. At present, the vessel system of well-known brands such as NBS, Sartorius and Applikon has been tested. FMT-E series with the advantage of a full-featured controller, it is evolving into the latest generation of Shuoboda' fist products.



### SECOND-GENERATION GUI

- The new second-generation GUI, industry-leading design
- Digital dynamic dashboard: dynamic changes of fermenter are apparent to the eye
- Refined design, the colors are distinct, simple and fast operation
- The functional area is versatile, and the standard includes four-way intake control and exhaust gas analysis system

### SIMATIC-1200 HIGH-END PROCESSOR

- Adopt Siemens the latest 1200 series high-end processor, in line with international standard
- Modular design and scalable function, scalable Smart200 module
- Integrated PROFINET, network and other buses are used for remote use, and the control is accurate and fast

### WATSON-MARLOW HIGH PRECISION VARIABLE SPEED

### FLIP PUMP

- Easy to use and strong stability
- Step electrode adjustable speed, standard bus communication control
- FOAM, ACID, BASE, FEED four-way pump can be customized and interchangeable

## COMPONENTS BRANDS

Item	Specifications
pH sensor	METTLER TOLEDO, HAMILTON
DO sensor	METTLER TOLEDO, HAMILTON
pH, DO signal line	METTLER TOLEDO
Controller	Siemens High-end Series, independent intellectual property rights of PID program control
Touch-screen	HMI TPC10
Mechanical seal	JOHN CRANE
Peristaltic pump	WASTON-MARLOW
Feeding bottle	SCHOTT
Glass rotor flowmeter	DWYER
PT100 sensor	JUMO
Low-voltage electric	SCHNEIDER
Cold water quick coupling	CPC



**HAMILTON**

**SIEMENS**



**mcgStpc**

**SCHOTT**

**JUMO**



**Schneider Electric**

**WATSON MARLOW**





## COMPARABLE TO IMPORTED MANUFACTURING

### PROCESS OF VESSEL

- The design ideas of vessel derived from Sartorius and Applikon, replaceable vessel
- Stable air-tightness, convenient for laboratory operation with quick disassembly and assembly
- Stainless steel material of AISI 316L with fine grinding and electrolytic polishing, the overall manufacturing process is comparable to imported products from abroad.

### AUTOMATIC AIR INTAKE SYSTEM

- Adopt Swiss imported thermal mass flow meter MFC
- Ventilation digital control, can be linked with DO
- Reduce the impact of ventilation on the process and automate the control process

### THE MOST POWERFUL FMT-MONITOR

- Integrated vessel cold water temperature control, condenser cold water temperature control
- Scalable: exhaust analysis, ORP, weighing balance, Biomass analysis, etc
- Built-in SD-control V22 software, can be implemented online monitoring, recording, curve display
- It can be matched with Analysis software SD-Analysis, V1.0
- External OPC XML DA VIA Ethernet data communication can be connected

## SPECIFICATIONS

Nb.	Item	Specifications
1	Vessel	<ul style="list-style-type: none"> <li>Full volume: options include 3L, 5L, 10L. No need to replace the controller</li> <li>Liquid volume: Max.80%</li> <li>Design pressure: Max 0.15Mpa</li> <li>Fermenter lid inlets: Air inlet, Four-in-one feed inlet, Temperature tube, cooling coil, pH/DO electrode inlet, Feed inlet, Alternate inlet, off gas condenser (Detachable)</li> </ul>
2	Stirring system	<ul style="list-style-type: none"> <li>Servo motor with high precision and low noise. Special mechanical seal</li> <li>RPM0~1200rpm<math>\pm</math>1 rpm</li> <li>Fifteen sections speed: the program sets the required speed of each section</li> </ul>
3	Air inlet system	<ul style="list-style-type: none"> <li>Air inlet: Air, Quick disassembly structure</li> <li>Imported glass rotor flowmeter</li> <li>Annular gas distributor, Optional microporous bubble distributor</li> </ul>
4	pH detection and control system	<ul style="list-style-type: none"> <li>Range: 2.00~12.00pH precision: <math>\pm</math>0.02</li> <li>Sterilization temperature: 0~130°C</li> <li>Controller: SD-K integrated transmitter with filter, signal isolator and RS-485 communication</li> </ul>
5	DO detection and control system	<ul style="list-style-type: none"> <li>Range: 0~200%, Precision: 0.1%</li> <li>Sterilization temperature: 0~130°C</li> <li>Controller: SD-K integrated transmitter with filter, signal isolator and RS-485 communication</li> </ul>
6	Temperature Control System	<ul style="list-style-type: none"> <li>Electric heating mode of thermal blanket</li> <li>24V safe voltage</li> <li>Temperature control range: Cooling water +5°C~65°C, <math>\pm</math>0.1 °C</li> <li>Temperature sensor: Imported PT100 platinum electrode (quick disassembly resistant to high temperature)</li> </ul>
7	Cold water module	<ul style="list-style-type: none"> <li>Integrated FMT-M controller, independent module</li> <li>Communication with host PLC, electromagnetic valve controls the flow-off</li> <li>Cold water connector adopts imported self-locking quick coupling, which contains self-locking valve</li> </ul>
8	Peristaltic pump	<ul style="list-style-type: none"> <li>4 channels peristaltic pump including FOAM/FEED/ACID/BASE</li> <li>Imported flip peristaltic pump, quick connection</li> <li>Peristaltic pump: Accumulated flow, instantaneous flow, speed adjustment, 100% adjustment, associated PID adjustment, manual control and other functions</li> </ul>
9	Defoaming system	<ul style="list-style-type: none"> <li>Mechanical defoaming paddle with rake and compression</li> <li>Defoamer: Flow addition by peristaltic pump</li> <li>High-sensitive defoaming electrode</li> </ul>
10	sampling	<ul style="list-style-type: none"> <li>Sterile sampling system: autoclave sterilization</li> <li>Syringe negative pressure design: remove bacteria contamination during sampling</li> <li>Dual design: users can also use traditional flame inoculation method</li> </ul>
11	FMT-M Controller SD-Control v2.2 control system	<ul style="list-style-type: none"> <li>10.1-inch HMI touch screen, brightness &gt; 350 cd/m<sup>2</sup></li> <li>Siemens SIMATIC -1200 Series high-end processor</li> <li>Low voltage electrical appliances use schneider and other international well-known brands</li> <li>SD-Control V2.2 embedded control software configuration for full local operation</li> <li>FOA, pH, DO, T can realize automatic and manual control</li> <li>Curve display, historical data records and USB export functions of RPM, pH, DO, T</li> <li>Four-way Air intake, O<sub>2</sub>, N<sub>2</sub>, CO<sub>2</sub> control and display (with option)</li> <li>Online display: OUR, CER, K<sub>La</sub>, RQ (with option)</li> </ul>

		<ul style="list-style-type: none"> <li>Scalable: ORP, biomass, balance, external peristaltic pump, exhaust analyzer (including imported and domestic, etc.</li> <li>It can be used with the Analysis software SD-Analysis V1.0</li> <li>External OPC XML DA via Ethernet data communication</li> </ul>
	power supply	<ul style="list-style-type: none"> <li>Input: AC110~240v/1.2kw</li> <li>Output: Motor, thermal blanket, peristaltic pump and other power parts use 24V safety voltage</li> </ul>

## OPTIONAL ACCESSORIES

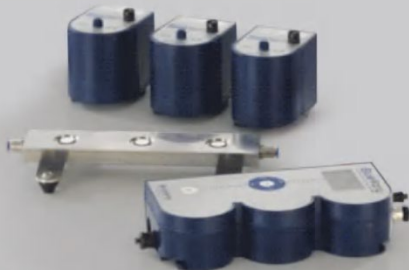
In order to allow users to better use our fermenters, we have developed a variety of high-quality accessories for users to meet the needs of users in different industries and different working conditions. Users can choose relevant accessories according to their own conditions.

### Feeding and weighing system



- Brand: METTLER-TOLEDO
- Maximum weighing: 2200g
- Precision: 0.01g
- Control: FMT-M main controller control
- Association: Association control through feeding can customize amount

### Exhaust gas analyzer



- Brand: German BlueSens
- CO2 range: 0-10%, 0-25%, 0-50% optional
- CO2 range: 0.1-25%, 0.1-50% optional
- Precision: 3% of measured value, 0.2% of range
- Can be display online: OUR, CER, RQ

### ORP motor



- Brand: METTLER-TOLEDO
- High temperature sterilization: -30°C -130°C
- Transmitter: SD-K integrated transmitter, including filtering and self-calibration, RS-485 communication
- FMT-M Controller Controls and Settings



## Living cell online concentration



- ABER-Biomass imported living cell online concentration detection
- Real-time online monitoring, of the concentration, density, dry weight of living cells and biomass volume, capacitor size, conductivity size

## Online OD



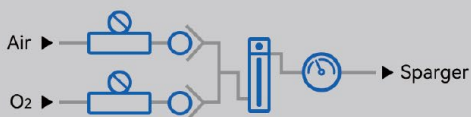
- Imported brand from Germany, the same style as Sartorius
- Interface Pg13.5, length: 120mm Measurement wavelength: 730nm-970nm
- Optical path length OPL: 1-1000mm Online determination of OD value, data and curve display, compare the data with the fermentation process

## VENTILATION



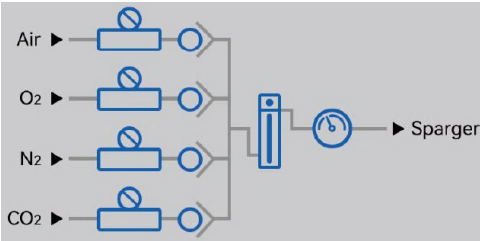
### Airflow

- MFC controls gas flow
- One-way valve prevents gas backflow
- Flow meter displays real-time flow
- The pressure gauge monitors the pressure in the vessel



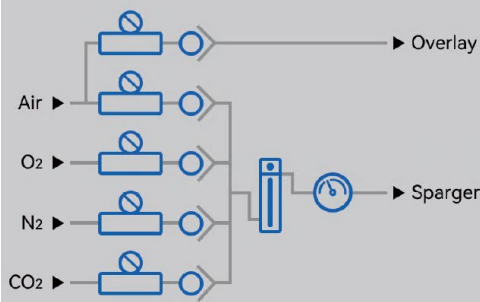
### O2-Enrichment

- Bypass oxygen enrichment: Mixing and O<sub>2</sub> replenishment of Air and O<sub>2</sub> via MFC
- The MFC and one-way valve are used to control the air flow
- Glass rotameter shows total flow
- O<sub>2</sub> replenishment is automatically controlled by the system
- The pressure gauge monitors the pressure in the vessel in real time



## Gas Flow Ratio Control

- Air, O<sub>2</sub>, CO<sub>2</sub> and N<sub>2</sub> are separately controlled and mixed by MFC, one-way valve, through the mixing of different volumes of different gases, the gas requirements of various working conditions can be fully met
- The controller changes the CO<sub>2</sub> gas flow through the pH value
- Different volume ratio control of Air, O<sub>2</sub>, and N<sub>2</sub> by changing the DO value
- The total flow is displayed by a glass rotameter



## Advanced Additive Flow

- T5-way MFC for gas control respectively
- Air, O<sub>2</sub>, CO<sub>2</sub> and N<sub>2</sub> four-way gas mixing control for deep ventilation
- Another way of Air (or other designated way) is superficial ventilation by MFC and one-way valve

## SECOND GENERATION GUI

Since the creation of the first-generation GUI, Shuoboda has received many feedback from customers with comments on aesthetics, ease of use, and more. In 2022, by the improvement of the usual GUI design features of the fermenter, Shuoboda works with a professional graphic design team combined with users' feedback to create the second-generation GUI with visual impact and practicality.

The second-generation GUI uses the latest dashboard design language to update the dynamic numbers and graphics that users care about most. The user can observe the key data in the fermentation process at a glance by looking at the digital panel, without entering the secondary interface. Animations and dynamic presentations are made for graphics, which tend to be more flexible and intuitive. With the second-generation GUI, the user can grasp accurately the parameters and status of the fermenters, thus making rapid decisions.

GUI created by the professional design team has both a sense of design and practicability. The data and operations that users care about are convenient and easy to identify, enhancing familiarity and efficiency.





### 3. FMT-C Series Laboratory Compact Glass Multi- Parallel Bioreactor Fermenter



#### DESCRIPTION

Fermenter FMT-C is a classic and standard system developed by SHUOBODA for laboratory users. FMT-C adopts the latest design language and modular design concept, which is suitable for the design requirements of multiple working conditions in the laboratory. Absorbing foreign sophisticated design concepts, the product is small in size. And it is painted in classic white, with a novel appearance and a strong sense of design. The series adopts imported glass rotor flowmeter, high-precision flip pump and bus control communication method, which greatly improves the precision and stability of the equipment.

FMT-C adopts a deep modular process design language, an all-in-one structure of the vessel and the control unit, which makes overall space small. All kinds of weak wires are short and easy to install that can be quickly put into laboratory use. The compact size is especially friendly to female users. The modular design concept makes the FMT-C series the best presentation for multiple fermenters. By building blocks, it can easily realize double, triple, quadruple, quintuple, sextuple, and more combined vessel systems. The system can be used separately or in a unified way, which is very adaptable to users and scenarios with different needs.

## COMPONENT BRANDS

Reliable components are the guarantee of product durability, the key components of FMT-C series are selected from domestic and foreign first-line brands. Our suppliers include: SIEMENS, METTLER TOLEDO, SCHNEIDER ELECTRIC, Dwyer and other partners, Shuoboda truly accomplish quality control from the source.



## SECOND-GENERATION GRAPHICAL INTERFACE

- New second-generation graphical interface, leading industry design
- Digital dynamic instrument panel, tank dynamics, process changes at a glance
- Refined design, bright color division, simple & fast operation
- Perfect functional details

## ALL-ROUND CONTROL

- Standard independent cold water control system using imported CPC self-locking joint
- Tank wrap-around main cabinet
- Sturdy removable base for flexible tabletop placement

## HIGH-PRECISION VARIABLE SPEED FLIP PUMP

- High-precision flip pump, easy to use and strong stability
- Silicone tube floating saddle, stable delivery pressure
- FOAM, ACID, BASE, FEED four-way pump can be customized, interchangeable ports.



## COMPARABLE TO IMPORTED MANUFACTURING PROCESS OF VESSEL

- The design ideas of vessel derived from Sartorius and Applikon, Replaceable vessel
- Stable air-tightness, Convenient for laboratory operation with quick disassembly and assembly
- Stainless steel material of AISI 316L with fine grinding and electrolytic polishing. The overall manufacturing process is comparable to imported products from abroad.



## SMALLEST FMT-M CONTROLLER

- Integrated cold water temperature control of independent vessel and condenser
- One of the smallest cabinets in the industry to date
- Glass rotor flowmeter can be upgraded to 2-6 channels
- Built-in SD-Control V2.2 control software: online monitoring, recording and curve displaying Available for external data communication of OPC XML DA Via Ethernet



## SECOND GENERATION TOUCH GRAPHICAL USER INTERFACE

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## SPECIFICATIONS

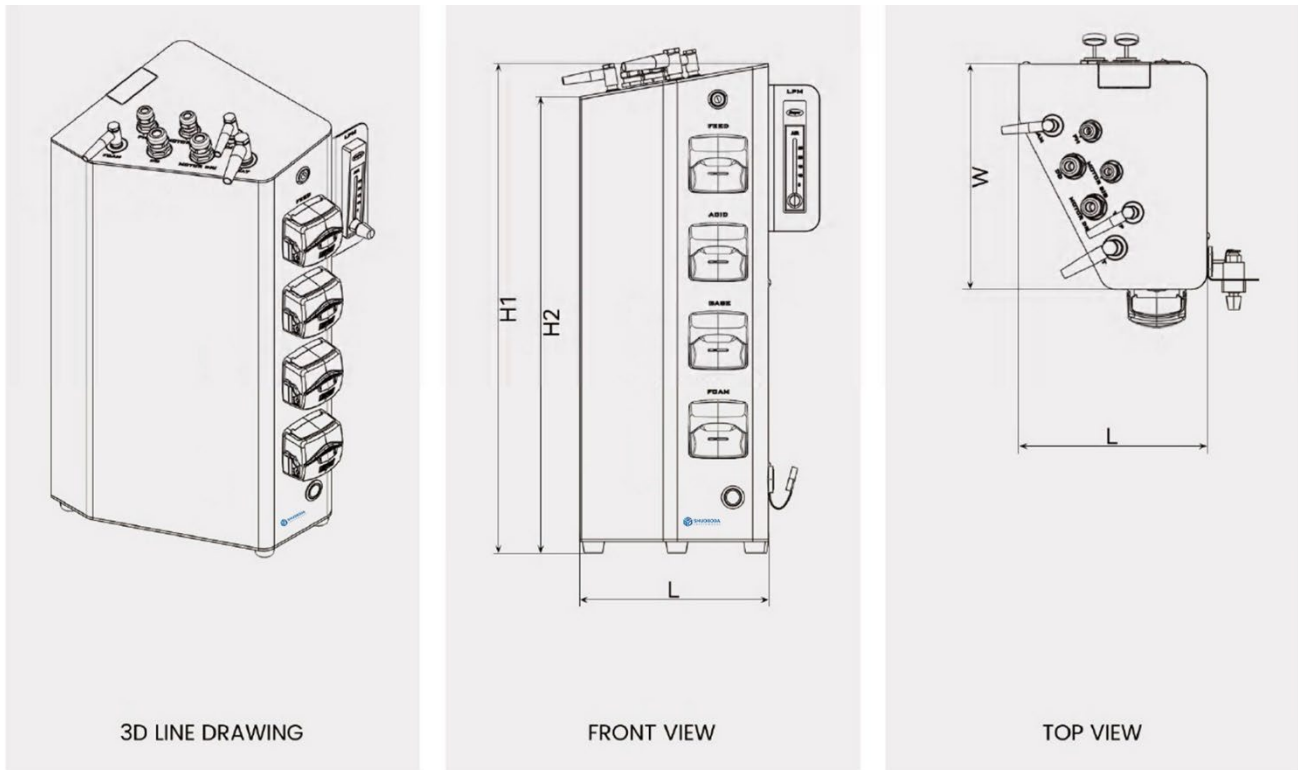
Nb.	Item	Specifications
<b>Tank</b>		
1	Tank body	<ul style="list-style-type: none"> <li>Full volume: 1L, 3L, 5L, 10L, 15L optional, no need to replace the controller</li> <li>Filling volume: Max. 80%</li> <li>Design pressure: Max 0.15Mpa</li> <li>Tank cover port: air inlet, four-in-one feeding port, temperature sleeve, cooling coil, PH/DO electrode port, feed port, spare port, exhaust gas condenser (removable)</li> </ul>

Controller		
1	Stirring system	<ul style="list-style-type: none"> <li>Servo motor with high precision and low noise. Special mechanical seal</li> <li>RPM: 0-1200rpm <math>\pm</math>1rpm</li> <li>Fifteen sections speed: the program sets the required speed of each section</li> </ul>
2	Temperature Control System	<ul style="list-style-type: none"> <li>Electric heating thermal blanket</li> <li>24V safe voltage</li> <li>Temperature control range: Cooling water <math>+5^{\circ}\text{C}</math>-<math>65^{\circ}\text{C}</math> <math>\pm</math>0.1<math>^{\circ}\text{C}</math></li> <li>Temperature sensor: Imported PT100 platinum electrode (quick disassembly resistant to high temperature)</li> </ul>
3	Cold water module	<ul style="list-style-type: none"> <li>Integrated FMT-M controller, independent module</li> <li>Communication with host PLC, electromagnetic valve controls the flow-off</li> <li>Cold water connector adopts imported self-locking quick coupling, which contains self-locking valve</li> </ul>
4	Defoaming system	<ul style="list-style-type: none"> <li>Mechanical defoaming paddle with rake and compression</li> <li>Defoamer: Flow addition by peristaltic pump</li> <li>High-sensitive defoaming electrode</li> </ul>
5	pH detection and control system	<ul style="list-style-type: none"> <li>Range: 0-14.00pH precision: <math>\pm</math>0.02</li> <li>Sterilization temperature: 0-130<math>^{\circ}\text{C}</math></li> <li>Controller: SD-K integrated transmitter with filter, signal isolator and RS-485 communication</li> </ul>
6	DO detection and control system	<ul style="list-style-type: none"> <li>Range: 0-100% O<sub>2</sub> sat, Precision: <math>\pm</math>(1% of the numerical reading+6ppb)</li> <li>Sterilization temperature: 0-130<math>^{\circ}\text{C}</math></li> <li>Controller: HN-K integrated transmitter with filter, signal isolator and RS-485 communication</li> </ul>
7	FMT Controller SD-Control v2.2 control system	<ul style="list-style-type: none"> <li>10-inch HMI touch screen, brightness <math>&gt;</math>350 cd/m<sup>2</sup></li> <li>Siemens SIMATIC - Smart Series processor</li> <li>Low voltage electrical appliances use schneider and other international well-known brands</li> <li>SD-Control V2.2 embedded control software configuration for full local operation</li> <li>FOA, pH, DO, T can realize automatic and manual control</li> <li>Curve display, historical data records and USB export functions of RPM, pH, DO, T</li> <li>Extensible: glass rotor flowmeter of 2-4channels, balance, external peristaltic pump, etc.</li> <li>External OPC XML DA via Ethernet data communication</li> </ul>
8	Multi fermenters extension	<ul style="list-style-type: none"> <li>Multiple system expansion of 2-8 fermentors</li> <li>Local HMI centralized control</li> <li>Multi-fermentors adopt network cable bus communication mode</li> </ul>
Other info		
1	Air inlet system	<ul style="list-style-type: none"> <li>Air inlet: Air, Quick disassembly structure</li> <li>Imported glass rotor flowmeter</li> <li>Annular gas distributor, Optional microporous bubble distributor</li> </ul>
2	sampling	<ul style="list-style-type: none"> <li>Sterile sampling system: autoclave sterilization</li> <li>Syringe negative pressure design: remove bacteria contamination during sampling</li> <li>Dual design: users can also use traditional flame inoculation method</li> </ul>
3	power supply	<ul style="list-style-type: none"> <li>Input: AC110 ~ 240v/1.2kw</li> <li>Output: Motors, thermal blankets, peristaltic pumps and other power components use 24V safe voltage</li> </ul>
4	Size(L*W*H)	<ul style="list-style-type: none"> <li>Dimensions after assembly: 295*327*763mm</li> </ul>

**COMPACT & POWERFUL**

The FMT-C series follows the concept of deft design. After calculating the internal structure in detail, engineers reduce the size of the chassis by more than 20% to achieve a compact and comprehensive characteristic. The height of the main control box is only 54cm, with a modular design, it is an integrated structure with the tank body, and the overall occupying space is small which is in line with the market. Compared with other laboratory fermenters, the volume advantage is obvious.

Exquisite and compact at the same time, taking into account the powerful functions. The whole series adopts imported glass rotor flowmeter, convenient and quick clamshell peristaltic pump and bus control the communication mode, which greatly improves the precision and stability of the equipment.



External dimensions of the chassis

	Size (cm)		Size (cm)
L	21cm	H1	54cm
W	24cm	H2	50cm

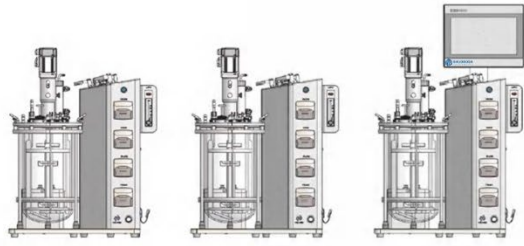
## MULTIPLE FERMENTORS

FMT-C has been deeply integrated with the modular design concept from the beginning of its design. Its compact size makes it easy to implement the multiple fermenters strategy. The most advanced BUS wiring system is also adopted in the process of automation research and development.

Each product of FMT-C is equipped with a local touch screen HMI which is an independent fermenter for standalone use. And apart from HMI, it is a host system matched on site. Multiple fermenters can be connected to a local HMI which can realize multi-connection. The multi-use scenarios and adaptability of customers have never been easier.



3 #

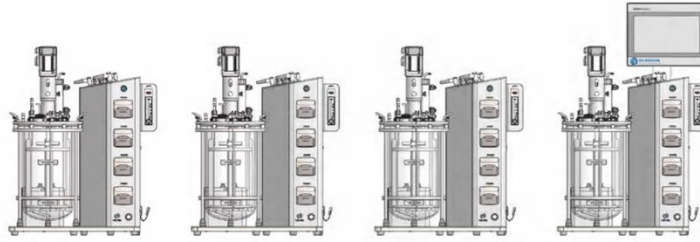


F03

F02

F01  
Master Control

4 #



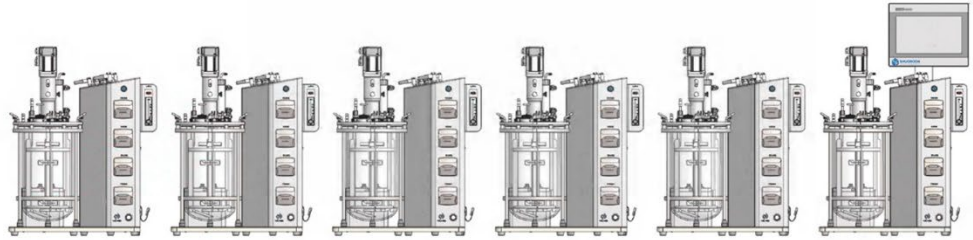
F04

F03

F02

F01  
Master Control

6 #



F06

F05

F04

F03

F02

F01  
Master Control

## 4. FMT-T series Laboratory duplex fermenter bioreactor, dual tank, parallel fermenter



FMT-T laboratory duplex fermenter is a special series from shuoboda for laboratory users with two parallel fermenters. The product adopts a system strategy of one main unit controlling two fermenters. Users can choose to use dual control or single vessel. FMT-T duplex fermenter is a stable and useful laboratory equipment with excellent quality and high-cost performance. FMT-T series double fermenter adopts integrated host design. 10-inch high-end touch screen which can control two 1L-15L class fermenters at the same time or separately. It adopts four sets of peristaltic pumps and variable speed peristaltic pump design. Siemens PLC is the control core, common hardware and consumables with FMT

series.

### ADVANTAGES

- 8 channels peristaltic pump including FOAM/FEED/ACID/BASE
- Stable air-tightness, Convenient for laboratory operation with quick disassembly and assembly
- Two imported glass rotor flowmeters
- 10-inch HM touch screen
- Built-in SD-Control V2.22 control software, can control a single vessel or parallel control

### APPLICATIONSCOPE

- Bacterial Fermentation
- Protein-based Drugs



Bacterial Fermentation

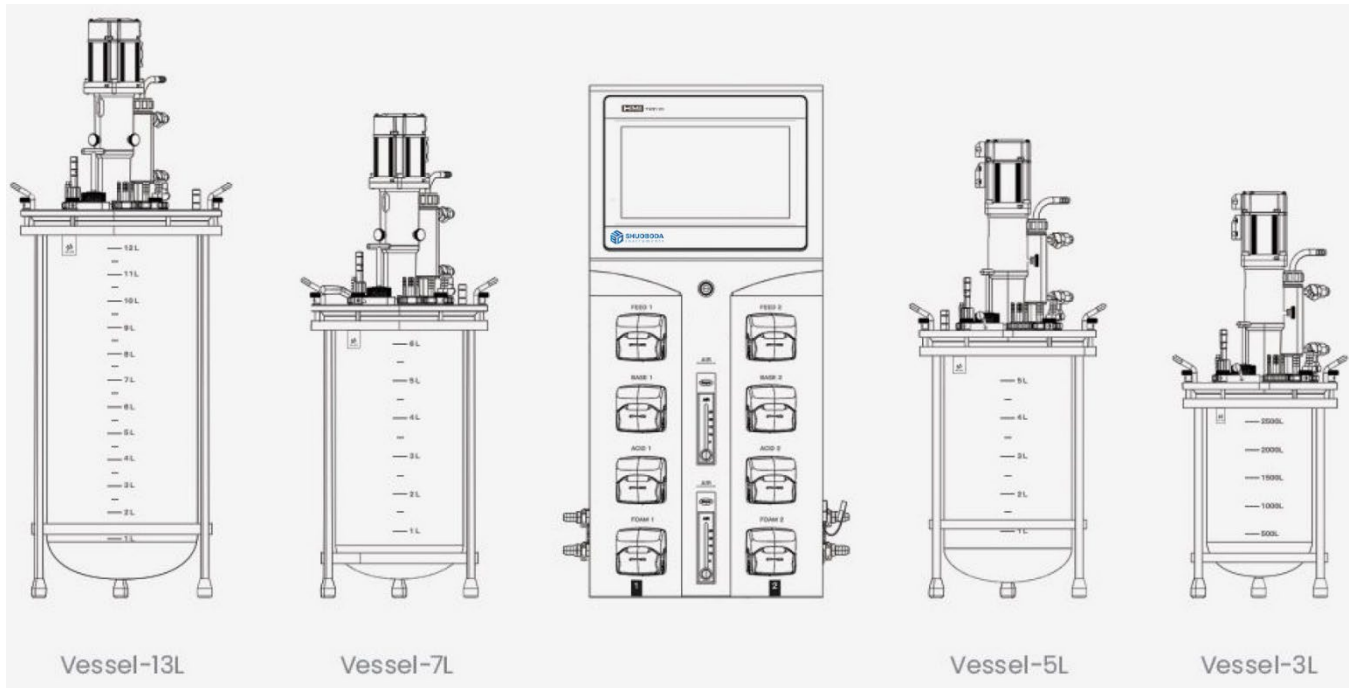


Protein-based Drugs

### MULTI-PARALLEL SYSTEM

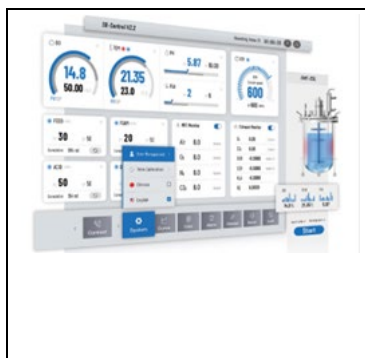
FMT-T series is an experimental equipment for laboratory users to perform simultaneous fermentation. The product adopts a system strategy of one main unit controlling two fermenters, and the glass vessel contain 3L, 5L, 7 and 13L, supporting free combination and matching. Users can choose to use dual control or single vessel. which is extremely flexible for users with

different needs and scenarios.



## FEATURES

	<p><b>Comparable to imported manufacturing process tanks</b></p> <ul style="list-style-type: none"> <li>• Derived from Sartorius and Applikon tank design ideas, replaceable</li> <li>• Stable air tightness, convenient and quick disassembly and assembly mechanism, and convenient laboratory operation</li> <li>• Made of overall AISI 316L stainless steel, precision ground and electrolytic polished, the overall manufacturing process is comparable to the same imported products from the United States and abroad.</li> </ul>
	<p><b>High-end configuration of the entire series</b></p> <ul style="list-style-type: none"> <li>• Siemens SIMATIC-Smart series original processor</li> <li>• High-precision flip-top peristaltic pump and original imported components</li> <li>• Main power parts such as motors, insulation blankets, and peristaltic pumps all use 24V low-voltage DC</li> <li>• Equipped with 8 peristaltic pumps, the functions can be freely defined as acid addition, alkali addition, defoaming, and feeding.</li> </ul>
	<p><b>Powerful FMT-M2 Controller</b></p> <ul style="list-style-type: none"> <li>• Equipped with a 10-inch advanced touch screen and using Bus communication to achieve dual control</li> <li>• The main screen displays the main operating parameters of 2 sets of parallel tanks at the same time, which can control a single tank or in parallel.</li> <li>• Built-in SD-Control V2.2 control software, which can implement online monitoring, recording, tracking and other functions</li> <li>• Can be externally connected to OPC XML DA via Ethernet data communication</li> </ul>



### The second-generation graphical interface parallel control system

- Brand new second generation graphical interface, leading industry design
- Comfortable human-computer interaction experience, simple and convenient operation, and supports external expansion
- Achieve data visualization and information graphics, and process changes can be seen at a glance
- Refined design, distinct color divisions, and perfect functional

## SPECIFICATIONS

Nb.	Item	Specifications
1	Vessel	<ul style="list-style-type: none"> <li>• Full volume: 3L, 5L, 7L, 10L, 13L, 15L optional, 2 groups configured, can be freely combined</li> <li>• Liquid filling capacity: Max 80%</li> <li>• Design pressure: Max 0.15Mpa</li> <li>• Glass tank: high temperature resistant borosilicate glass</li> <li>• Can lid: AISI 316L stainless steel, electrolytic polished</li> <li>• Tank cover: air inlet, four-in-one feeding port, temperature sleeve, cooling coil, pH/DO electrode port, feed port, spare port, tail gas condenser (removable), harvest tube, defoaming Electrode port</li> </ul>
2	Stirring system	<ul style="list-style-type: none"> <li>• 2 high-precision and low-noise servo motors, with low operating noise and jitter, and more stable operation</li> <li>• Speed: 0~1000rpm±1rpm</li> <li>• Innovative inorganic seal design, the first in the industry, makes the mixing system cleaner and more hygienic</li> <li>• No installation guidance, no installation and maintenance, just put into use</li> <li>• Intelligent sequence control, which can adjust mixing parameters within a customized time period</li> </ul>
3	Air inlet system	<ul style="list-style-type: none"> <li>• Air intake: Air, quick release structure</li> <li>• 2 imported glass rotor flowmeters, optional MFC</li> <li>• Annular gas distributor, optional microporous bubble distributor</li> <li>• General ventilation is divided into 2 channels into 2 groups of fermentation tanks, and is equipped with a 2-channel air intake system</li> </ul>
4	pH detection and control system	<ul style="list-style-type: none"> <li>• Configure 2 sets of pH modules</li> <li>• Range: 0.00~14.00 pH accuracy: ±0.02</li> <li>• Sterilization temperature: 0~140°C</li> <li>• Control: SD-K integrated transmitter, with filter, signal isolator, RS-485 communication</li> <li>• Association settings: pH is automatically associated with the acid-base pump, the dead zone is customized, and the accuracy can reach ±0.02</li> <li>• Intelligent sequence control, which can adjust pH parameters within a customized time period</li> </ul>
5	DO detection and control system	<ul style="list-style-type: none"> <li>• Configure 2 groups of DO modules</li> <li>• Range: 0~100% O<sub>2</sub> saturation, accuracy: ±1%</li> <li>• Sterilization temperature: 0~140°C</li> <li>• Control: SD-K integrated transmitter, with filter, signal isolator, RS-485 communication</li> <li>• Multi-stage cascade control of DO, stirring, and feeding ensures sufficient gas output during the experiment.</li> <li>• Satisfy custom time period DO parameter control</li> </ul>
6	Temperature Control	<ul style="list-style-type: none"> <li>• Dual temperature control means of electric heating and cooling water for thermal insulation blanket</li> </ul>

	System	<ul style="list-style-type: none"> <li>• 24V safety voltage</li> <li>• Temperature control range cooling water <math>+5^{\circ}\text{C} \sim 65^{\circ}\text{C} \pm 0.1^{\circ}\text{C}</math></li> <li>• Temperature sensor: imported PT100 platinum electrode (high temperature resistant quick release form)</li> <li>• The cold-water module is integrated with the FMT-M2 controller, communicates with the host PLC, and controls the on-off of the solenoid valve.</li> <li>• The cold-water connector adopts imported self-locking quick interface, and the interface contains a self-locking valve.</li> </ul>
7	Peristaltic pump	<ul style="list-style-type: none"> <li>• Equipped with 8-channel peristaltic pump, the functions can be freely defined as acid addition, alkali addition, defoaming, and feeding.</li> <li>• High-precision variable-speed flip-top pump, quick connection</li> <li>• Applicable to multiple specifications of silicone tubes, the flow rate can reach up to 560.04mL/min</li> <li>• The peristaltic pump can realize functions such as instantaneous flow, cumulative flow, speed adjustment, manual and automatic switching operation, and associated PID adjustment.</li> <li>• Feeding system supports one-time, on-time, index, and equation feeding</li> <li>• With intelligent sequence control, feeding parameters can be adjusted at any time as needed.</li> </ul>
8	Defoaming system	<ul style="list-style-type: none"> <li>• Equipped with 2 sets of mechanical defoaming stirring paddles</li> <li>• Defoaming agent: peristaltic pump can be added manually or automatically</li> <li>• Highly sensitive defoaming electrode</li> </ul>
9	sampling	<ul style="list-style-type: none"> <li>• Sterile sampling system, sterilizable by high temperature and high pressure</li> <li>• The negative pressure design of the syringe eliminates the worry of bacterial contamination during the sampling process.</li> <li>• Dual design, users can also use traditional flame inoculation method to inoculate</li> </ul>
10	FMT-M Controller SD-Control v2.2 control system	<ul style="list-style-type: none"> <li>• 10-inch HMI touch screen, brightness <math>&gt;350\text{cd}/\text{m}^2</math></li> <li>• Siemens SIMATIC-Smart series original processor</li> <li>• Low-voltage electrical appliances use internationally renowned brands such as Schneider</li> <li>• Embedded SD-Control V2.2 embedded control software configuration to achieve full local operation</li> <li>• DC, pH, DO, T, FOA, etc. can be controlled automatically and manually</li> <li>• RPM, TEM, pH, DO curve display function, historical data recording and USB export</li> <li>• Meta-Tri<sup>®</sup> audit trail, the exclusive research and development system automatically stores operation records, and the experimental process can be traced</li> <li>• Real-time protection of experimental data, advanced permissions to restrict export and deletion, and prevent data leakage</li> <li>• Can be externally connected to OPC XML DA via Ethernet data communication</li> <li>• In addition to the standard configuration, users are supported to add: 2~4 channels of ventilation, balance, exhaust gas analysis, external peristaltic pump, etc.</li> </ul>
11	power supply	<ul style="list-style-type: none"> <li>• Input: AC110~240v/1.2kw</li> <li>• Output: Motor, thermal blanket, peristaltic pump and other power parts use 24V safety voltage</li> </ul>



# 5. FMT-H Series Multiple-tank Parallel Fermenter Bioreactor



FMT-Hseries multi-parallel fermenter s a standard multi-parallel fermenter designed for laboratory users, suitable for laboratory parallel fermentation research, for laboratory multi-condition parallel exploration and research, for laboratory at different temperatures, The exploration and comparative study of fermentation yield under the conditions of PH, DO, stirring, etc., compared with the traditional single-tank system, shortens the development time and cycle exponentially. FMT-Hseries adopts an integrated stainless steel chassis design, 15.6-inch high-definition large-screen touch screen, clear interface, easy to operate, and can meet the needs of 3 to 9 groups of tanks for parallel fermentation research.

## ADVANTAGES

- Adopts SIMATIC-1200 high-end processor
- Adopts RS-485 bus control communication, improving system operation stability
- The vessels contain 3L, 5L, 7L and 13L, supporting free combination and matching
- SD-Control V2.22 multi-connection control system, can be used in a single vessel or in multiples
- Extensible: ORP, exhaust gas analysis, online OD, etc.

## Application scope



Bacterial Fermentation



Protein-based Drugs



Cell Culture



Virus-based Vaccine



Antibody Drug





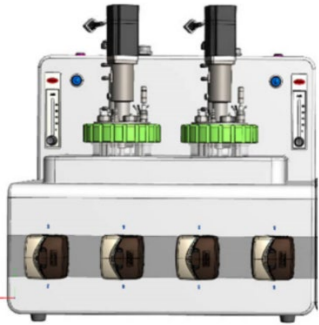
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## FEATURES



### Comparable to imported manufacturing process tanks

- Derived from Sartorius and Applikon tank design ideas, replaceable
- Stable air tightness, convenient and quick disassembly and assembly mechanism, and convenient laboratory operation
- overall AISI 316L stainless steel, precision ground and electrolytic polished, the overall manufacturing process is comparable to the same imported products from the United States and abroad.

	<p><b>Advanced Pump Solutions</b></p> <ul style="list-style-type: none"> <li>• Adopt four-way pump body solution</li> <li>• Each group of pump bodies adopts variable speed regulation</li> <li>• Pump body adopts roller high-precision pump, which is not easy to be damaged</li> </ul>
	<p><b>Excellent FMT-MT large screen controller</b></p> <ul style="list-style-type: none"> <li>• 15.6-inch high-definition large screen, Internet of Things control</li> <li>• Siemens Smart 200 series PLC, satisfying basic operation and cost-effective</li> <li>• Overall stainless-steel wire drawing process meets the requirements of hygiene and wear resistance</li> <li>• Built-in SD-Control V2.0 control software, which can implement online monitoring, recording and curve display</li> </ul>
	<p><b>Core technologies</b></p> <ul style="list-style-type: none"> <li>• Core R&amp;D team comes from the fermentation tank team of the German company, with stable and reliable technical support</li> <li>• Strong corporate philosophy supports the excellence of our products</li> <li>• Product design is comparable to imported fermentation tanks such as NBS and Applikon</li> </ul>

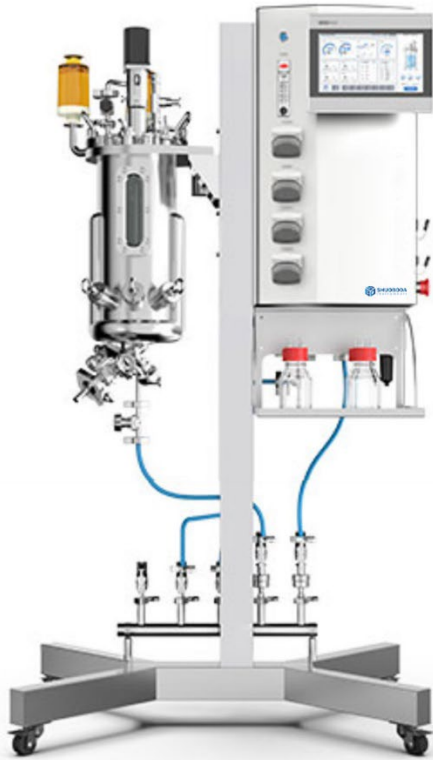
## SPECIFICATIONS

No.	Item	Specifications
1	Vessel	<ul style="list-style-type: none"> <li>• Volume: 3L, 5L, 10L, 15L</li> <li>• Material: Tank body: High temperature resistant borosilicate glass, Tank lid: AIS316L stainless steel</li> </ul>
2	Stirring system	<ul style="list-style-type: none"> <li>• Stirring motor: high-precision servo motor, speed 0-1200rpm</li> <li>• Stirring method: top mechanical stirring</li> <li>• Special stirring paddle: single-layer oblique blade stirring paddle, flat blade stirring paddle</li> </ul>
3	Air inlet system	<ul style="list-style-type: none"> <li>• Flowmeter: Rotameter imported from Dwyer in the United States, electromagnetic flowmeter is optional</li> <li>• Filter: Sartorius high-efficiency sterilizing filter from Germany, with a filtration accuracy of up to 0.2um</li> </ul>
4	pH detection and control system	<ul style="list-style-type: none"> <li>• Brand: Swiss Mettler Toledo</li> <li>• Control range: 2.00~12.00 pH</li> <li>• Control: SD-K integrated transmitter, signal isolator, 485 communication</li> </ul>
5	DO detection and control system	<ul style="list-style-type: none"> <li>• Brand: Swiss Mettler Toledo</li> <li>• Control range: 0~200%</li> </ul>



	control system	<ul style="list-style-type: none"> <li>Control: LF-K integrated transmitter, signal isolator, 485 communication</li> </ul>
6	Temperature Control System	<ul style="list-style-type: none"> <li>Temperature sensor: pt100 platinum electrode (high temperature quick release form)</li> <li>Insulation blanket electric heating method</li> <li>Temperature control range: 5~65C</li> </ul>
7	Feeding system	<ul style="list-style-type: none"> <li>Feed Pump: Peristaltic Pump Flow Addition</li> <li>Control mode: manual or automatic control</li> </ul>
8	Defoaming system	<ul style="list-style-type: none"> <li>Foam detection: highly sensitive defoaming probe</li> <li>Defoaming paddle: mechanical defoaming paddle with rake compression</li> <li>Antifoam Pump: Peristaltic Pump Flow Addition</li> </ul>
9	sampling	<ul style="list-style-type: none"> <li>Sterile sampling system, autoclavable</li> <li>Dual design, users can also use traditional flame inoculation to inoculate</li> </ul>
10	FMT-M Controller SD-Control v2.2 control system	<ul style="list-style-type: none"> <li>Controller: Siemens PLC controller</li> <li>15.6-inch high-definition large screen, Internet of Things control</li> <li>Whole machine is made of stainless steel AISI304 wire drawing process, fine grinding</li> <li>Curve display function, historical data recording and export</li> </ul>
11	Size(L*W*H)	<ul style="list-style-type: none"> <li>Chassis 645 * 1355 * 700mm</li> </ul>
12	power supply	<ul style="list-style-type: none"> <li>Input: AC110~240v/1.2kw</li> <li>Output: Motor, thermal blanket, peristaltic pump and other power parts use 24V safety voltage</li> </ul>

## 6. FMT-S Series stainless steel bioreactor fermenter



The FMT-S series laboratory stainless steel fermenter is a special series specially developed for laboratory users and specially used in the application scenarios of laboratory stainless steel fermentation tanks.

This series adheres to the design soul of "SMART - exquisite and intelligent", and is developed as a standard equipment suitable for laboratory use, with a small footprint, flexible operation, and can meet the vast majority of laboratory fermentation application scenarios.





In order to realize the characteristics of compactness and intelligence, engineers have made many bold attempts and applications in the overall design, including the adoption of tank cover finishing design ideas, the introduction of the overall solution for respiratory filters in the pharmaceutical industry, and the absorption and acceptance of Halls ultrafiltration tubes. The design plan of the hygienic and compact pipeline of the road finally presented the "SMART" design concept.

The FMT-S series adopts a modular design, and the main pipe is made of hose, which can realize the conventional functions of the fermentation tank and the fully automatic sterilization function. At the same time, it is easy to operate and is comparable to the use experience of laboratory glass fermentation tanks.

The FMT-S series is suitable for use in laboratories on a pilot scale. The optional tanks for overall matching are: 10L, 30L and 50L. It can also be customized to other tanks of various specifications. For laboratory stainless steel fermentation tanks, the FMT-S series is undoubtedly an excellent choice among similar competing products in the current market.

### FEATURES

	<p><b>Excellent, sophisticated design brings the industry's most outstanding tank system</b></p> <ul style="list-style-type: none"> <li>• The can lids and connecting parts are returned to the machining center for finishing, and the weight of the can lids is reduced by 50% compared to the past.</li> <li>• Large-area tanks are manufactured by pressure vessel qualified factories</li> <li>• Overall material is AISI 316L stainless steel, precision ground and electrolytic polished. The overall manufacturing process has completely surpassed similar competing products.</li> </ul>
	<p><b>High-precision flip-top peristaltic pump</b></p> <ul style="list-style-type: none"> <li>• Easy to use and strong stability</li> <li>• Applicable to multiple specifications of silicone tubes, the flow rate can reach up to 326.55mL/min</li> <li>• FOAM, ACID, BASE and FEED four-way peristaltic pumps, customizable and interchangeable</li> </ul>

	<p><b>Creative pipeline layout</b></p> <ul style="list-style-type: none"> <li>• Creative and fully hidden design of the main power pipeline, installed on the back panel</li> <li>• Optional steam temperature control method</li> <li>• Overall modularity, adaptable to different tank demands, and fully removable for cleaning and maintenance</li> </ul>
	<p><b>Integrated air filter</b></p> <ul style="list-style-type: none"> <li>• Abandon the traditional filter element to completely clear the biggest obstacle for automatic sterilization. All series are equipped with automatic sterilization as standard</li> <li>• Support online SIP/CIP, 10 cycles @135°C, 60min</li> <li>• TCP clamp connection, easy to replace</li> </ul>
	<p><b>Second generation graphical interface</b></p> <ul style="list-style-type: none"> <li>• New second-generation graphical interface, leading industry design</li> <li>• Digital dynamic instrument panel, tank dynamics and process changes are clear at a glance</li> <li>• Refined design, distinct color divisions, simple and fast operation</li> <li>• Complete functional details</li> </ul>
	<p><b>Small but powerful FMT-M controller</b></p> <ul style="list-style-type: none"> <li>• All stainless steel, compliant with GMP and other all-scenario applications</li> <li>• Matching imported glass rotor flowmeter</li> <li>• Built-in SD-Control V2.2 control software can implement online monitoring, recording, curve display, automatic sterilization and other functions.</li> <li>• Can be externally connected to OPC XML DA via Ethernet data communication</li> </ul>

## SECOND GENERATION TOUCH GRAPHICAL USER INTERFACE

Since the creation of the first-generation GUI, Shuoboda has received many feedback from customers with comments on aesthetics, ease of use, and more. In 2022, By the improvement of the usual GUI design features of the fermenter, Shuoboda works with a professional graphic design team combined with users' feedback to create the second-generation GUI with visual impact and practicality.

The second-generation GUI uses the latest dashboard design language to update the dynamic numbers and graphics that users care about most. The user can observe the key data in the fermentation process at a glance by looking at the digital panel, without entering the secondary interface. Animations and dynamic presentations are made for graphics, which tend to be more flexible and intuitive. With the second-generation GUI, the user can grasp accurately the parameters and status of the fermenters, thus making rapid decisions.

GUI created by the professional design team has both a sense of design and practicability. The data and operations that users care

about are convenient and easy to identify, enhancing familiarity and efficiency.



## BASIC INFORMATION

- Series: FMT-S series
- Tank volume: 10L, 30L, 50L
- Automatic temperature control: cooling water cooling, constant temperature water circulation heating system
- Control system embedded SD-Control 2.2 Control system
- Multi-connection expansion: support 28 -connection multi-connection expansion

## SPECIFICATIONS

Nb.	Item	Specifications
<b>Tank</b>		
1	Tank information	<ul style="list-style-type: none"> <li>• Full volume: 10L, 30L, 50L optional, no need to replace the controller</li> <li>• Design pressure: Max 0.25Mpa</li> <li>• Tank:                             <ol style="list-style-type: none"> <li>1) Inner wall: AISI 316L stainless steel, mirror polished, <math>Ra \leq 0.4</math>;</li> <li>2) Outer wall: AISI 304 stainless steel, mirror polished, <math>Ra \leq 0.4</math>;</li> </ol>                             The entire tank system complies with GMP hygiene requirements, has no dead ends and is easy to clean.                         </li> <li>• Interfaces: air inlet, exhaust port, inoculation port (flame inoculation), feed port, outlet (sampling port), four-in-one feeding port, pressure gauge interface, pH DO, foam sensor interface, etc.</li> <li>• The tank is equipped with large glass side mirrors and Philips mirror lights, which can clearly observe the fermentation status.</li> </ul>

Control system		
1	Stirring system	<ul style="list-style-type: none"> <li>High-precision and low-noise servo motor, with low operating noise and vibration, and more stable operation</li> <li>Speed: 0~800rpm <math>\pm</math> 1rpm</li> <li>Special mixing paddles for fermentation: single-layer inclined blade mixing paddles, flat blade mixing paddles, the designated mixing paddles can be replaced</li> <li>Intelligent sequence control, adjusting mixing parameters within unlimited customized time periods</li> </ul>
2	Temperature Control System	<ul style="list-style-type: none"> <li>Temperature online detection system: PT100 platinum electrode, PID control, with automatic temperature compensation function, equipped with stainless steel electrode sheath and stainless-steel electric heating tube</li> <li>Range: 0-200°C Accuracy: <math>\pm</math> 0.2</li> <li>Automatic temperature control: cooling water cooling, constant temperature water circulation heating system</li> <li>Optional steam heat exchanger temperature control system</li> </ul>
3	Peristaltic pump	<ul style="list-style-type: none"> <li>FOAM / FEED / ACID / BASE four-way peristaltic pump</li> <li>High-precision variable-speed flip-top pump, easy to install</li> <li>Applicable to multiple specifications of silicone tubes, the flow rate can reach up to 326.55ml/min</li> <li>The peristaltic pump can realize: cumulative flow, instantaneous flow, speed adjustment, manual and automatic switching operation, associated PID adjustment and other functions</li> </ul>
4	Defoaming system	<ul style="list-style-type: none"> <li>Defoaming paddle: with rake type compression mechanical defoaming paddle</li> <li>Defoaming agent: peristaltic pump flow addition</li> <li>Highly sensitive defoaming electrode</li> </ul>
5	pH detection and control system	<ul style="list-style-type: none"> <li>Range: 0.00~14.00 pH accuracy: <math>\pm</math> 0.02</li> <li>Sterilization temperature: 0~130°C</li> <li>The electrode is equipped with a stainless-steel sheath</li> <li>Control: SD-K integrated transmitter, with filter, signal isolator, RS-485 communication</li> </ul>
6	DO detection and control system	<ul style="list-style-type: none"> <li>Range: 0-200%, accuracy: <math>\pm</math> 0.1%</li> <li>Sterilization temperature: 0~130°C</li> <li>The electrode is equipped with a stainless-steel sheath</li> <li>When the cascade function is enabled in automatic control, it can be associated with one or more parameters such as stirring, ventilation, and feeding.</li> <li>Control: SD-K integrated transmitter, with filter, signal isolator, RS-485 communication</li> </ul>
7	FMT-M Controller SD-Control v2.2 control system	<ul style="list-style-type: none"> <li>10.1-inch HMI touch screen, brightness &gt;350 cd/m<sup>2</sup></li> <li>Siemens SIMATIC-Smart series original processor</li> <li>Low-voltage electrical appliances use internationally renowned brands such as Schneider</li> <li>Embedded SD-Control V2.2 embedded control software configuration to achieve full local operation</li> <li>FOA, pH, DO, T, etc. can be controlled automatically and manually</li> <li>RPM, pH, DO, T curve display function, historical data recording and USB export</li> <li>Expandable: 2-4-channel glass rotor flowmeter, exhaust gas analysis, online OD, external peristaltic pump, etc.</li> <li>Can be externally connected to OPC XML DA via Ethernet data communication</li> </ul>
8	Multi-connection expansion	<ul style="list-style-type: none"> <li>Supports 2-8 link multi-link expansion</li> <li>Support local HMI centralized control and external host computer control</li> <li>The joint tank connection adopts network bus communication method</li> </ul>
Other information		

1	Air inlet system	<ul style="list-style-type: none"> <li>Air intake: Air, quick release structure</li> <li>Imported glass rotor flowmeter</li> <li>Sterilization diaphragm valve: Air pipeline sterilization design, with diaphragm valve control, completely sterilizes the air intake pipeline</li> <li>Annular gas distributor, optional microporous bubble distributor</li> </ul>
2	Integrated air filter	<ul style="list-style-type: none"> <li>The air filtration adopts an integrated filter with a filtration precision of 0.2 <math>\mu\text{m}</math> and a filtration area of 0.15 <math>\text{m}^2</math>.</li> <li>Support online SIP/CIP, support GMP certification documents and integrity testing</li> </ul>
3	Pipelines and racks	<ul style="list-style-type: none"> <li>Valve material: AISI 316L, valves in contact with materials adopt imported first-line brand diaphragm valves</li> <li>The pipeline is made of stainless steel, precision polished; argon gas shielded welding; complies with GMP requirements, including material pipeline system, air pipeline system, coarse steam pipeline system, fine steam pipeline system, transplantation pipeline system, and water pipeline system, auxiliary pipelines; related valve pipelines comply with GMP hygiene requirements</li> <li>Using a stainless-steel hanging stand with pulleys installed at the bottom for easy movement</li> </ul>
4	power supply	<ul style="list-style-type: none"> <li>Input: AC110~240v/6.5kw</li> </ul>

## MAIN COMPONENTS BRAND

Item Name	Brand
pH sensor	METTLER TOLEDO
DO2 sensor	METTLER TOLEDO
DO2 signal line	METTLER TOLEDO
PLC Controller	Siemens SMART
Touch screen	MOGS
Machinery Seal	UK JOHN CRANE
Peristaltic pump	UK BOXER
Refill bottle	Germany SCHOTT
Rotameter	American DWYER
PT100 sensor	JuMo, Germany
Low voltage electrical	Schneider
Automatic Diaphragm Valve	HEBRON
Air filter	COBETTER
Circulating pump	Denmark GRUNDFOS

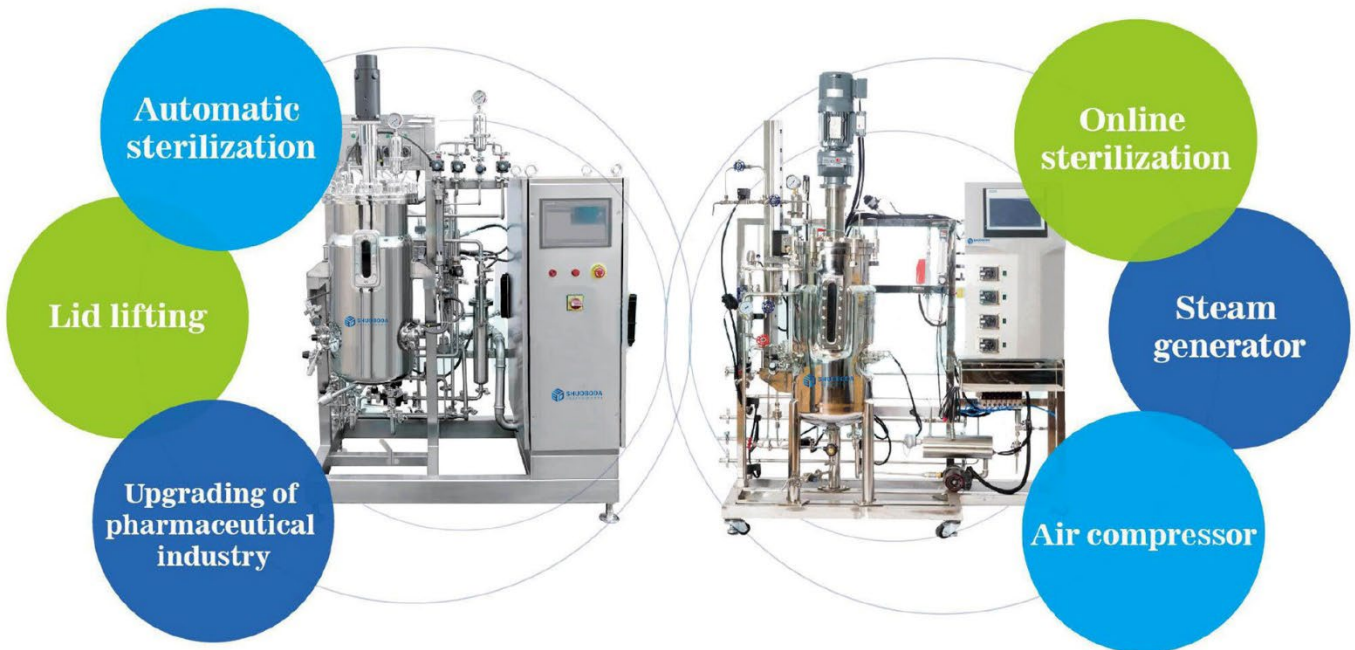






# 7. FMT-AS Series Stainless Steel Fermenter, 10L, 20L, 30L, 50L,

## 100L



### SYSTEMS DESCRIPTION

This fermentation system mainly includes tank body, pipe valve, air filtration system, temperature automatic control system, speed control system, pH online detection and automatic control system, DO online monitoring and automatic control system, automatic [www.shuoboda.com](http://www.shuoboda.com)

defoaming, automatic feeding, PLC centralized Control system, host computer control system, etc. Oil-free silent air compressor, automatic electric steam generator.

Design pressure 0.3 Mpa; body material: 316L stainless steel, jacket 304 stainless steel; with special sampling valve for fermentation tank, bottom discharge valve, with side large viewing angle mirror, 12V safety Philips lighting, with temperature, pH DO, Defoaming port, acid and alkali replenishment port, inoculation port, replenishment port, air inlet, exhaust port, seed transfer port, liquid level electrode, defoaming electrode, etc.; internal polishing accuracy Ra0.4, external polishing accuracy Ra0.6. All welds are firm, neat and beautiful.

## TECHNICAL SPECIFICATIONS

No.	Item name	Specifications				
		Model	FMT-AS10L	FMT-AS20L	FMT-AS30L	FMT-AS50L
1.	Tank capacity	10L	20L	30L	50L	100L
	Tank size	Φ 180× 400mm	Φ 230× 500mm	Φ 273× 550mm	Φ 300× 650mm	Φ 400× 750mm
	Jacket size	Φ 220× 3mm	Φ 273× 3mm	Φ 325× 3mm	Φ 350× 3mm	Φ 450× 4mm
	Tank	<ul style="list-style-type: none"> <li>• Sterilization in place, design pressure 0.3 Mpa;</li> <li>• Body material: 316L stainless steel, jacket 304 stainless steel;</li> <li>• With special sampling valve for fermentation tank, bottom discharge valve, with side Large-view mirror, 12V safety Philips lighting, with Temperature, pH DO, defoaming port, acid and alkali replenishment port, inoculation port, feed port, air inlet, exhaust port, seed transfer port, liquid level electrode, defoaming electrode, etc.;</li> <li>• Internal polishing accuracy Ra0.4, external polishing accuracy is Ra0.6, and all welds are firm, neat and beautiful.</li> </ul>				
2.	Motor power	0.4kw	0.75kw	1.0kw	1.0kw	1.5kw
	Speed range	50~600rpm ± 1%	50~600rpm ± 1%	50~600rpm ± 1%	50~600rpm ± 1%	50~600rpm ± 1%
	Mixing system	<ul style="list-style-type: none"> <li>• Servo motor, speed governor, continuous and stable, adjustable; control accuracy ±1%</li> <li>• Top-type mechanical stirring system, adopts special 316L stainless steel for stirring shaft, AD mechanical seal (a special mechanical seal system that can meet higher fermentation requirements);</li> <li>• Adopts adjustable 2-stage 6-inclined blade stirring paddle, 1-stage compression type high-efficiency Bubble paddle, 4-level detachable baffle;</li> </ul>				
3.	Intake & filtration	<ul style="list-style-type: none"> <li>• Deep ventilation is adopted, with the maximum ventilation 1.5VVM;</li> <li>• Primary filtration, 0.01μm precision sterilization filter, fine filter selection of high-quality products, to ensure safety and independent sterilization, greatly extending the service life; annular gas distribution at the bottom Device</li> </ul>				
4.	pH control	<ul style="list-style-type: none"> <li>• Electrode: Mettler high temperature resistant glass electrode</li> <li>• Control range: 2-12pH display range: 0-14pH</li> <li>• Control accuracy: ±0.02pH resolution: 0.01pH</li> <li>• Control: Intelligent PID control, abnormal pH value alarm, segment control, data can be uploaded to the host computer</li> </ul>				
5.	DO2 control	<ul style="list-style-type: none"> <li>• Electrode: Mettler high temperature resistant glass electrode</li> <li>• Control range: 0-100%, display range: 0-200%,</li> <li>• Control accuracy: ±5%, resolution: 0.1%;</li> <li>• Control: Intelligent PID control, abnormal DO value alarm, data can be uploaded to the host</li> </ul>				

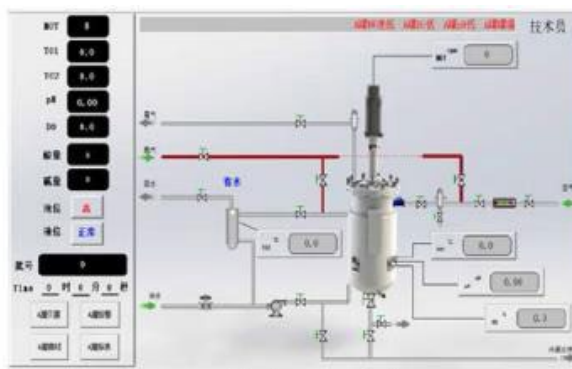
		computer
6.	Temperature Control System	<ul style="list-style-type: none"> <li>• Electric heating, water cooling, circulating pump temperature control, air escape function and water cut, over-temperature protection function, with good heat exchange efficiency,</li> <li>• Intelligent PID control not only ensures the rapidity of temperature control, but also realizes energy saving.</li> <li>• Fermentation temperature control range: cooling water temperature +6~50℃ ; accuracy: ±0.2℃ ; resolution: 0.1℃ ;</li> </ul>
7.	Defoaming system	<ul style="list-style-type: none"> <li>• Antifoaming agent: flow addition by peristaltic pump</li> <li>• Highly sensitive defoaming electrode</li> <li>• Control method: time and proportion automatic control</li> </ul>
8.	Flow detection system	<ul style="list-style-type: none"> <li>• Stainless steel flowmeter controls the intake air flow</li> <li>• Control method: manual control</li> </ul>
9.	Pressure detection system	<ul style="list-style-type: none"> <li>• Direct-mounted pressure gauge</li> <li>• Range: 0-0.4MPa</li> <li>• Control method: manual control</li> </ul>
10.	Automatic feeding system	<ul style="list-style-type: none"> <li>• Equipped with a complete replenishment system, the replenishment can be measured;</li> <li>• Number of peristaltic pumps can be selected according to needs, and the conventional configuration is four.</li> <li>• The role of the peristaltic pump can be selected and set on the control interface, which makes the user more convenient and flexible in actual use.</li> <li>• Equipped with specially designed replenishment pins to ensure the safe operation of replenishment.</li> </ul>
11.	Sterilization system	<ul style="list-style-type: none"> <li>• Manual control, the sterilization method includes jacket heating, and steam sterilization in the tank at the same time; or the tank does not enter the steam and sterilizes only by jacket heating</li> <li>• Sterilization temperature: 100-130℃ ;</li> </ul>
12.	Transplant	<ul style="list-style-type: none"> <li>• Can be transferred to the next level, using stainless steel valves and polished pipes;</li> <li>• The rationality of the design ensures the safe realization of the transfer</li> </ul>
13.	System equipped with valve pipeline	<ul style="list-style-type: none"> <li>• Valve material: AISI 316L, the valve in contact with the material adopts imported diaphragm valve</li> <li>• The pipeline is made of stainless steel with precision polished; argon gas shielded welding; meets GMP requirements</li> <li>• The stainless-steel table frame is used, and the bottom is installed with pulleys for easy movement</li> </ul>
14.	FMT-M controller & SD-Control control system	<ul style="list-style-type: none"> <li>• Siemens PLC programmable controller, advanced IoT touch screen, multi-touch operation</li> <li>• Online display, control and editing of all parameters, historical data recording and export, support user customization, and can also be customized according to user requirements</li> <li>• It can simultaneously detect and control the stirring speed, tank temperature, pH value, DO value, feeding, acid and alkali, defoaming, etc.;</li> <li>• Each parameter has PID adjustment process display, such as set value, real-time value, PID set value, upper and lower limit value;</li> <li>• The upper and lower limits of temperature, rotation speed, pH value, DO value can be set, and the limit alarm function is provided;</li> </ul>

		<ul style="list-style-type: none"> <li>• Speed, temperature, pH value, DO value, replenishment, etc. can be set to automatic, manual and closed states;</li> <li>• There is a complete feeding system, the peristaltic pump can periodically and quantitatively feed, the feeding can be measured, and the curve can be displayed;</li> <li>• With the function of over-level alarm and automatic refilling, with the function of over-foam level alarm and automatic addition of defoamer;</li> <li>• Equipped with the associated control of dissolved oxygen and speed, that is, the method of changing the speed to improve the dissolved oxygen concentration of the culture solution;</li> <li>• Associated control of feeding and pH Associated control of feeding and dissolved oxygen.</li> <li>• Sterilization manual control, the sterilization method includes jacket heating, and steam sterilization in the tank at the same time; or the tank does not enter the steam and sterilizes only by jacket heating, sterilization temperature: 100-130°C ;</li> <li>• The system has real-time display, data recording, data storage, data analysis (histogram, curve</li> <li>• Line graphs and batch reports) output printing, password management, abnormal analysis and other functions and alarm functions;</li> <li>• The historical data and curves of various parameters can be stored for many years (you must have a host computer to achieve); important</li> <li>• The parameters are written into the database synchronously to prepare for data analysis at any time. The real-time data can be restored intact when the power is cut off and the machine is restarted; the full Chinese interface is provided with detailed help instructions.</li> <li>• The parameters of each detection and control loop can be manually set and corrected online on the screen, temperature, PH and DO sensors can be adjusted and adjusted, and the flow rate of each peristaltic pump can be calibrated;</li> <li>• The system has self-adaptive and self-diagnostic capabilities; abnormal conditions can be automatically alarmed and protected according to customer settings.</li> <li>• All alarm accidents can be recorded and consulted;</li> <li>• Operation has a password protection function; the password is divided into operator and administrator level passwords;</li> <li>• With automatic control and manual control switching.</li> </ul>
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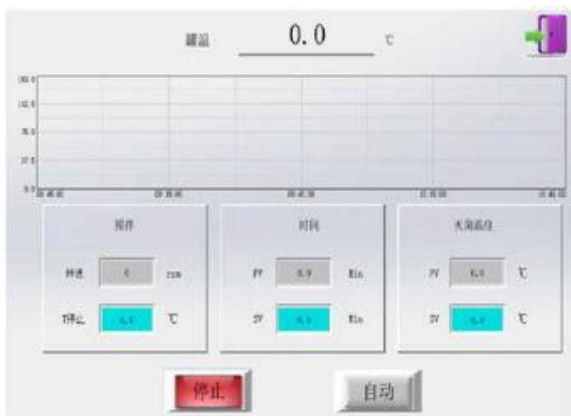
## MAIN CONTROL INTERFACE



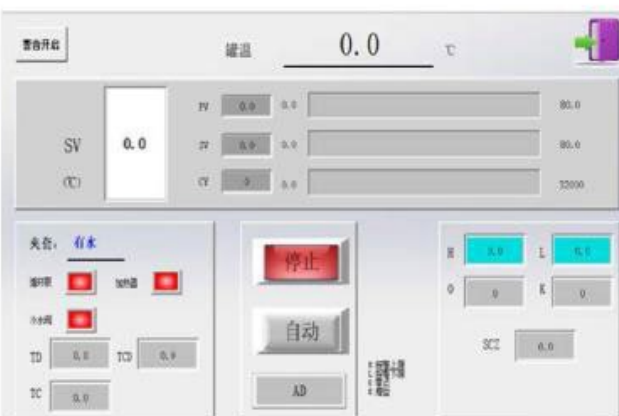
Login



Main control



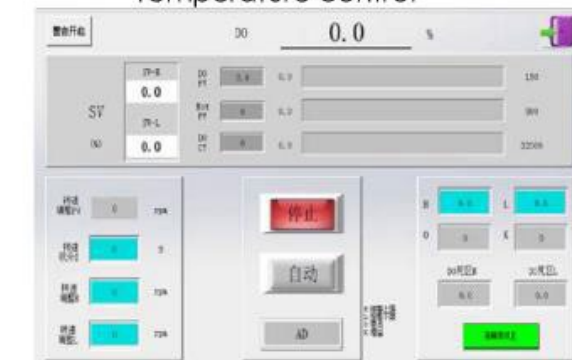
Sterilization



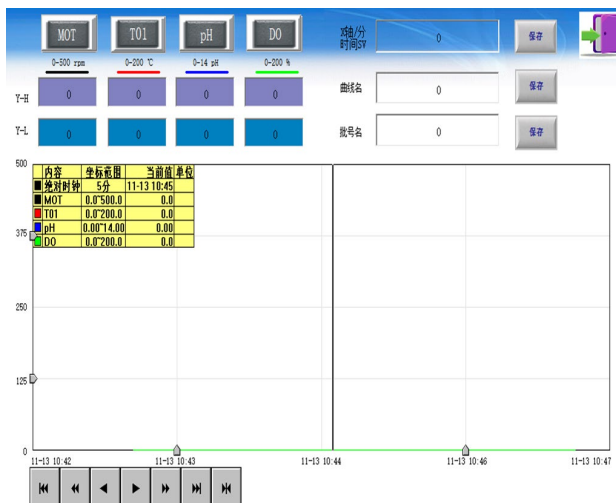
Temperature control



pH control



DO control



History curve

序号	时间	批号	发酵时间	转速	罐温	DO	pH	当前用户
1	2019-11-13 10:47:14	0	0.00	0	0.0	0.0	0.00	技术员
2	2019-11-13 10:46:13	0	0.00	0	0.0	0.0	0.00	技术员
3	2019-11-13 10:45:12	0	0.00	0	0.0	0.0	0.00	技术员
4	2019-11-13 10:44:11	0	0.00	0	0.0	0.0	0.00	技术员

History report (can be exported)



## KEY COMPONENTS




Nb.	Name	Description	Original
1	Tank	The material in contact with the liquid is 316L stainless steel; the rest is 304 stainless steel, precision-machined.	SHUOBODA
2	Special sampling valve	GRF	SHUOBODA
3	Machinery Seal	High-speed single-ended seal, 58U	Debao
4	Heater	Self-protection	QR
5	Stirring motor	Fermentation tank dedicated wide range, low noise, high temperature resistance, long life, constant torque speed regulation motor;	QR
6	Fermentation system software	Automatic fermentation system control software	SHUOBODA
7	Field control system	FMT-M controller SD-Control control system, including cabinet, control core, real-time control software, signal acquisition, frequency converter, power drive, switch master, man-machine touch screen display, etc. Control core: Siemens S7-200 series programmable controller; 10-inch true color touch screen.	SHUOBODA
8	Governor	Governor	QR
9	Rotameter	Flowrate: 50L/min	Changzhou
10	Intake and exhaust fine filter	0.01 $\mu$ m	Shanghai
11	Feeding peristaltic pump	0-55ml/min	Baoding
12	Defoaming peristaltic pump	0-55ml/min	Baoding
13	Acid supplement peristaltic pump	0-55ml/min	Baoding
14	Alkali peristaltic pump	0-55ml/min	Baoding
15	Circulation pump	Grundfos/Ville	Denmark/Germany
16	pHelectrode	Mettler	Switzerland
17	pHcable	Mettler	Switzerland
18	DO electrode	Mettler	Switzerland
19	DO cable	Mettler	Switzerland
20	jacket	ZGL-25BT-200	QR
21	Temperature electrode	PT100	Japan
22	Cooling water control valve	Yongchuang	Zhejiang
23	Diaphragm valve	Hebron	Shanghai
24	Piping system, supporting accessories	Pipelines, pipe racks, water valves, air valves, steam valves, safety valves, pressure gauges, sealing rings, clamps, connectors, etc., hoses, silicone tubes, pins, plugs, special tools.	SHUOBODA





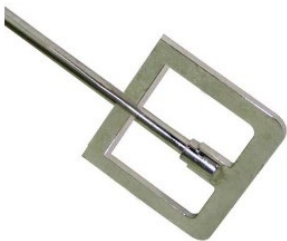




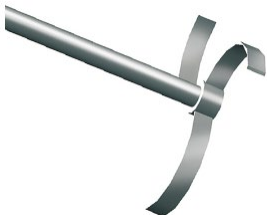
## STANDARD SPARE PARTS

Nb	Item Name	Specific	Qty
1	Blue cover high temperature refill bottle (glass)	250ml	3 pcs
2	Lan cover high temperature refill bottle (glass)	500ml	1 pc
3	Refill bottle accessories	Fit	4 set
4	Dedicated replenishment pin (with jacket)	3 needles	1 pc
5	Dedicated replenishment pin (with jacket)	1 needle	1 pc
6	High quality sanitary refill silicone tube	16#	8 m
7	Hgh-quality sanitary refill silicone tube	25#	8 m
8	Simple tools and toolbox		1 pc
9	Spare sealing O-ring	Connector	10 set
10	Special silicone plug		10 pcs
11	Sterilization filter 0.1μm (imported from Germany)	φ25mm	4 pcs

## PADDLETYPE(OPTIONAL)

Nb	Type	Picture	Description
1	Paddle		The basic structure of paddle agitator generally consists of four parts: paddle, key, collar and vertical shaft. Commonly used blades are generally made of ordinary flat steel or angle steel. When the stirred medium is corrosive to steel, the material used is stainless steel.
2	Back curved blade disc turboprop		Compared with the turbine type agitator, this type of agitator has the same basic flow pattern, and also has high shear capacity and larger circulation capacity. The difference is that there is one more disk, and some gas can be stored underneath to make the gas dispersion more stable. It is suitable for use in the process of gas dispersion absorption; the curved blade has a back angle, good discharge performance, and low power consumption.
3	Semicircular tube disc turboprop		Radial flow agitators, their blades are concave arc-shaped, with extremely strong radial displacement and dispersion ability, under the same power, its mass transfer coefficient is more than 20% higher than that of the flat blade disc turbine, and its air holding capacity increased by more than 30%, and the power consumption is relatively low, so it is especially suitable for the dissolved oxygen operation reaction similar to the fermentation process, and also suitable for other operations such as gas dispersion, absorption and mixing, mass transfer and heat transfer.

4	Parabolic disc turboprop		<p>Radial flow agitators, their blades are parabolic, have extremely strong radial displacement and dispersion ability, under the same power, its mass transfer coefficient is more than 30% higher than that of the flat blade disc turbine, and the air holding capacity is increased by more than 40% , And the power consumption ratio is very low, so it is especially suitable for the dissolved oxygen operation similar to the fermentation process, and it is also suitable for gas dispersion, absorption, mass transfer and heat transfer under other requirements.</p>
5	Turboprop		<p>This type of agitator draws on the development and development of advanced foreign similar products. Compared with the curved blade disc turbine type agitator, the basic flow pattern is the same, and it also has high shear capacity and greater circulation capacity. The difference is that it is larger in size and more than two. Only the disc is closed, a large amount of gas can be stored below, and the gas and liquid dispersion downward is more stable, and at the same time, higher speed is not required, so it is more suitable in the gas dispersion and absorption process. The paddle can be made into a detachable paddle to facilitate installation and maintenance.</p>
6	Propeller		<p>The three-blade propeller is the most typical axial flow type agitator, with high discharge capacity and low shear performance: the use of baffles or guide tubes will enhance the axial circulation and significantly improve the discharge performance because of its strong circulation and power Low consumption can best reflect its advantages when used in large-capacity homogeneous and mixing processes. It is widely used in low-viscosity liquid heat transfer, reaction, suspension and dissolution with a small solid-to-liquid ratio.</p>
7	Anchor paddle		<p>This type of agitator is a slow-speed agitator, suitable for the mixing, heat transfer or reaction process of medium and high viscosity liquids. The rotating surface of the paddle bottom is close to the elliptical surface of the container, and it also acts as a scraper. It mostly runs at low speed and often operates in laminar flow. Produce horizontal circular flow, such as hinged blade or angle steel blade, can increase the vortex near the blade.</p>
8	Anchor frame paddle		<p>This type of agitator is a slow-speed agitator, suitable for the mixing, heat transfer or reaction process of medium and high viscosity liquids. Often operate in laminar flow. Produce horizontal circular flow, such as hinged blade or angle steel blade, can increase the vortex near the blade. You can add vertical blades and beams on the paddle as needed to increase the mixing range.</p>

9	Screw propeller		<p>This type of agitator is a slow-speed agitator. It is often operated in the laminar flow zone. The liquid rises or falls along the spiral surface to form an axial upward and downward circulation. It is suitable for the mixing and heat transfer of medium and high viscosity liquids. The spiral ribbon profile of the spiral ribbon stirrer is close to the inner wall of the stirring tank, and the stirring diameter is large, which strengthens the up and down circulation of the liquid near the tank wall. The heat transfer process of the high viscosity liquid is very suitable. The screw-belt screw combination type has the characteristics of screw and spiral at the same time, which strengthens the circulation of the inner and outer liquids, and is especially effective for non-Newtonian plastic and viscoelastic liquids. It can be designed according to the shape of the bottom of the kettle.</p>
10	Brumakin Paddle		<p>A six-blade turbine type modified agitator. Radial flow pattern, the front end of the blade is widened and there is a back curve, which not only improves the discharge performance, but also reduces the shear strength. The power consumption is less, and the discharge performance is better than the straight blade or the curved blade opening turbine. When there is a baffle, it can form up and down circulation flow, which is more suitable for mixing, dispersion, solid-liquid suspension, dissolution and other processes.</p>
11	Three-blade swept propeller		<p>The radial flow agitator, combined with the finger-shaped baffle, can obtain a large flow of up and down circulation, and has good shearing effect. It is suitable for heat transfer, mass transfer, solid dissolution, solid-liquid suspension, polymerization, etc.</p>

After-sales service commitment

SHUOBODA INSTRUMENTS is committed to providing professional equipment and services in the field of bioengineering. In order to create a new generation of fermenters, SHUOBODA will provide the most comprehensive after-sales service system in the industry. Here we promise:

- 1) Free after-sales service for the following year. After the acceptance of the equipment, from the acceptance date of the acceptance, it promises to provide free warranty for the equipment for the next year (except human factors) for lifetime maintenance. If the inspection is not carried out within 30 days after arrival, the free warranty time will be calculated from the 30th day after the arrival.
- 2) Lifetime software upgrade support: SHUOBODA is committed to providing the best after-sales service, including our constantly improving software system, we will provide software upgrade service for users in 1-2 years according to the maturity of product software.
- 3) Timely response service: SHUOBODA adopts multi-level technical response method and provides product technical support. Our continuous improvement of dealer system in the country will provide users with reliable product after-sales support. Customers can also directly contact our after-sales service engineers, after-sales service engineers will give you timely after-sales response support within 24 hours.

4) After the insurance, product support:

a, consumables: due to the defects of consumables itself, SHUOBODA is responsible for free replacement. Standard consumables can be purchased by themselves or purchased by SHUOBODA

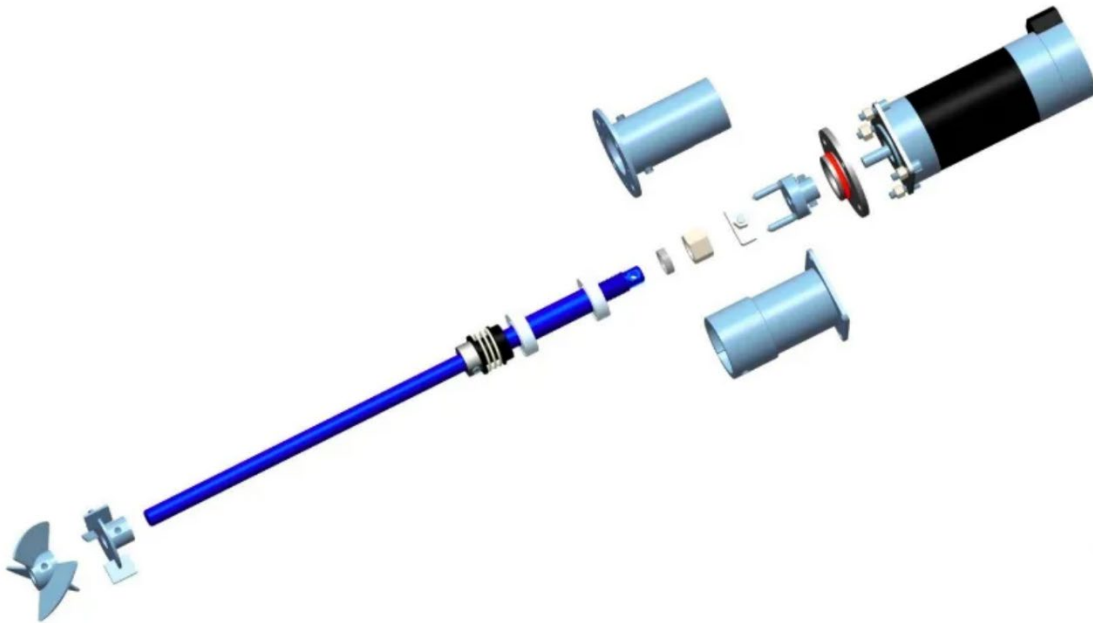
b. After the warranty period: The standard parts will be provided by SHUOBODA, which will be supplied all the year round to ensure the quick response of the purchase. At the same time, we only charge the basic production cost of the customer parts.

## PRODUCT PICTURE



# 8. Bioreactor Accessories

## STIRRING SYSTEM



As the most basic design part of the fermentation tank, the stirring and mixing system is an important part of the continuous and stable cultivation of the fermentation process, for different viscosities and different fermentation strains Shuoboda engineers have designed a variety of fermentation and stirring systems for users. Our fermentation stirring technology has been proven to be extremely reliable under different extreme working conditions.


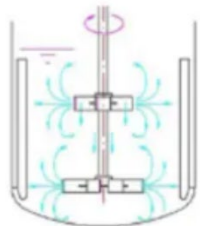

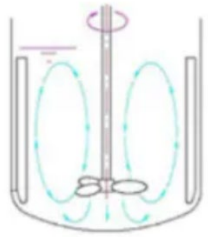

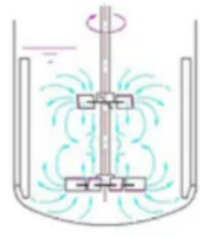

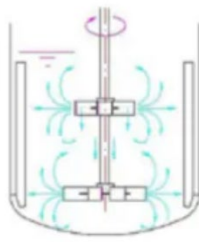
Shuoboda fermenter stirring and mixing system is mainly composed of a stirring motor, a linkage fast split structure, a coupling, a mechanical seal, a stirring shaft, and a stirring paddle. The mixing system designed by our company is not only stable and reliable, but also has the characteristics of maintaining continuous hygiene and reliability after the vibration experiment verification.

- Stirring motor: using mature and reliable precise servo system
- Adopt imported well-known brand mechanical seal to ensure no leakage
- Stability test to ensure the stability of the operation process

### Different forms of stirring paddles

Standard Universal Stirrer	propeller	Curved blade disc paddle	Inclined blade disc turbine impeller
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<p>Domestic fermentation standard general-purpose stirring paddle, the disc of the stirring paddle can block the rising bubbles, so that the gas in the tank can be well distributed. the six straight blades have good output power and stirring effect, and are suitable for most Newtonian, non-Fermentation culture of Newtonian fluids.</p>	<p>The liquid in the tank is advanced from bottom to top, forming a spiral flow, with good mixing effect and low shear force: but the gas dispersion effect is not ideal. t is suitable for fermentation culture with high viscosity and poor circulation.</p>	<p>The improved type of standard general-purpose stirring paddle reduces the shearing effect of the stirring paddle, and the mixing effect is slightly worse than that of the standard stirring paddle. It is suitable for low-viscosity and shear-sensitive bacterial fermentation culture.</p>	<p>Similar to the standard stirring paddle type it has good stirring effect and gas distribution effect but the curved blade has a strong output power effect than the straight blade. So it is suitable for fermentation culture with high stirring and mixing requirements.</p>

- Speed control range: 50-1200rpm, control accuracy: +5rpm
- SD bio DC speed control board
- Wide-range low-noise magnetic stirring motor: power 0.1Kw
- Stirring paddle: special standard for fermentation, the paddle height can be adjusted (different types of stirring paddles can be replaced according to the special requirements of the fermentation process), mechanical defoaming pulp with rake pressure type
- Optional bottom stress-free magnetic stirring system



## PERISTALTIC PUMP



Shuoboda fermenter products provide WATSON-MARLOW(UK, and professional custom peristaltic pumps for different users.

- Adopt professional custom peristaltic pump, which is optimized for fermentation and culture, with high quality
- Four-way peristaltic pump (changeable): acid pump, alkali pump, feed pump and defoaming pump
- Silicone tube adopts custom wear-resistant and high temperature resistant silicone tube
- Refill bottle: stress free high temperature serum bottle

## PH TRANSMITTER



Adopt Swiss original imported Mettler Inpro 3030 PH electrode, Mettler Ak9 electrode wire

### Features:

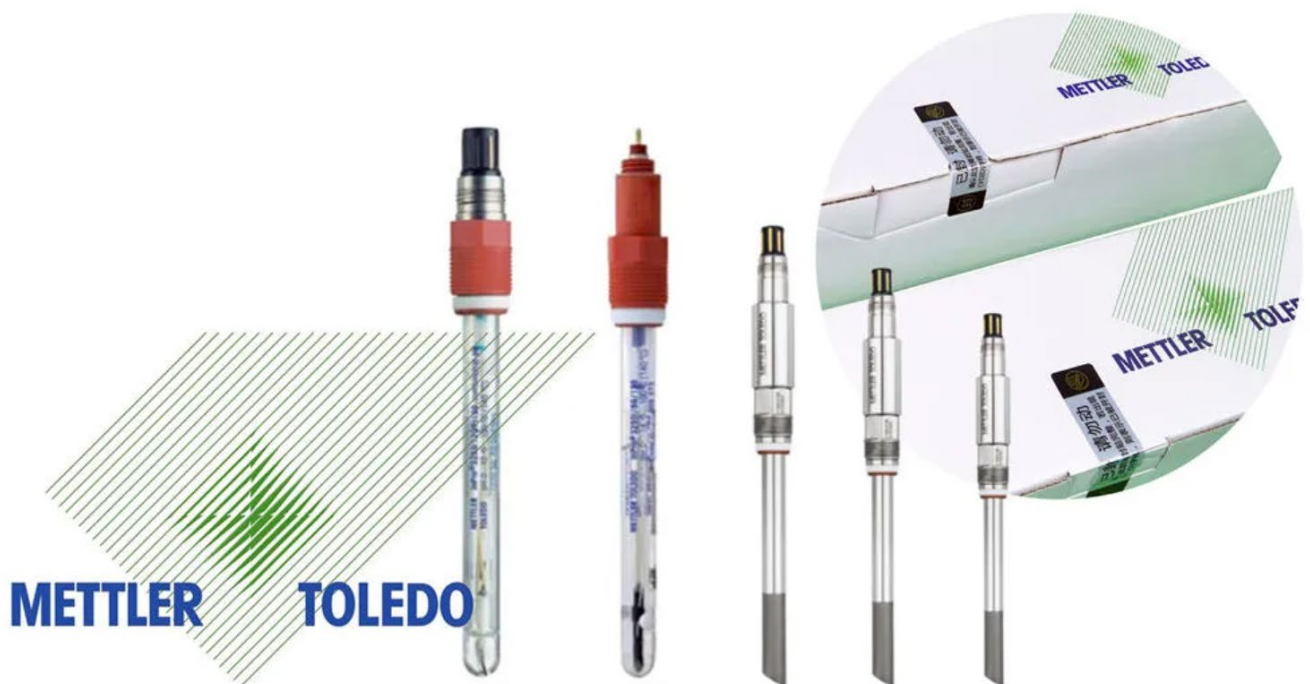
- low maintenance
- Gel-electrolyte electrodes with current-limiting separators.
- long electrode life
- This electrode uses a patented silver-ion trap technology, which prevents the formation of large amounts of silver sulfide on the surface of the separator in the sulfide medium, thereby extending the life of the electrode
- Sterilization in place and autoclaving
- The InPro3030 is specifically designed for use in aseptic bioprocessing or aseptic processes, and can be fully autoclaved or sterilized in place.
- medium pressure, this electrode can withstand overpressures up to 6 bar (87 psi)
- The InPro3030 is a professional technology, low maintenance gel pH-electrode for bioprocessing with excellent pressure resistance, specially developed for on-line measurement in bioprocessing applications.
- Switzerland METTLER (METTLER TOLEDO) PH electrode, wire
- LFM-P series transmitter
- Control range: 2.00-12.00ph, accuracy: +0.05; high temperature sterilization resistance

DO ELECTRODES

Adopt Swiss imported Mettler Inpro 6800 PHelectrode, VP6-ST cable  
Sensors for Hygienic Applications



- The sensor was developed to fully meet the EHEDG and FDA surface recommendations for applications with high hygienic grade requirements.
- Durable and hygienic design
- 316L stainless steel construction withstands CIP, steam sterilization or autoclaving. The polished surface treatment of the sensor eliminates process contamination.
- easy to integrate
- The InPro 6800 dissolved oxygen sensor can be easily integrated into your process. Its waterproof V connector (P68) helps ensure reliable measurements.
- Switzerland METTLER (METTLER TOLEDO) DO electrode, wire
- LFM-D series transmitter
- Control range: 0-100%, accuracy: +1%; high temperature sterilization



## GLASSTANKS



- 1L, 3L, 5L and 10L tanks are available
- Double-layer glass jars and single-layer glass jars are available
- Design inspiration comes from NBS and Applikon tank design
- Overall light and easy to move
- The tank lid design is thin and lightweight, with a modular opening design that is easy to expand. Even after you purchase the standard series fermentation tank, you can still easily change the configuration.
- The solderless design minimizes the occurrence of bacterial contamination and is an excellent design among domestic fermentation tanks.

## EXHAUST GAS ANALYZER



- CO2: Non-dispersive infrared (NDIR) method
- O2: Electrochemical method
- Resolution  $\pm 0.01\%$
- Standard connection with fermentation tank
- Paired with standard monitoring and analysis software
- Standard interface, seamless connection with other brands of fermentation tanks