

2023-2024 Catalogue

version 1.0





All about Winpact Fermentation and Cell Cultivation System

Winpact is a product brand under Major Science, devoted to creating a broad product portfolio for fermentation technologies. We focus on offering cell cultivation solution to the life sciences market.

Winpact provides a comprehensive and innovative line of cultivation products designed for different cell culture experiments and applications. The system is benchtop scale and has a large, color touch-screen panel with a user-friendly interface.

Its distinctive functions include various programming operations to control the pump speed, pH level, temperature, and more. The Winpact Fermentation System is able to connect to any PC for real-time recording and control within the vessel.

- * Subjects in picture are not up to scale.
- * All images are for reference only, actual products might differ from the pictures.
- * For further and updated information, please visit www.majorsci.com
- * Technical specifications subject to change without notice.





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*Subjects in picture are not up to scale.

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- Headplate Stand**
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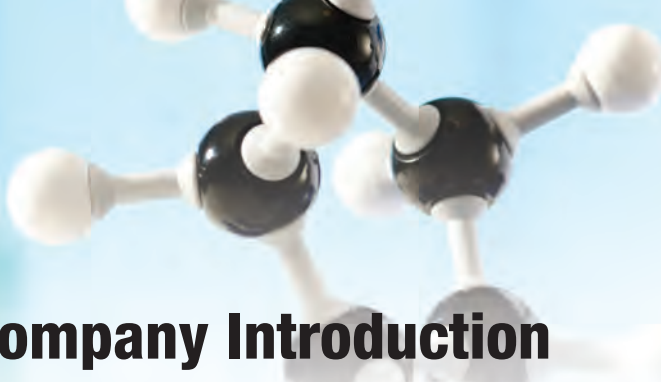


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Major Science Company Introduction

Who We Are

Founded in 1994 by a team of experienced engineers as well as up-and-coming design specialists, Major Science designs, manufactures, and markets laboratory equipment that supports scientific research in life sciences laboratories. Headquartered in Taiwan, Major Science provides laboratory products and quality services to biotechnology companies, academic institutions and government research labs across the world.

Major Science is consistently delivering cutting-edge instruments for the bio-industry that cover nearly all of your laboratory needs. We provide the Winpact serials brand products which are the state-of-the-art fermentor and bioreactor for the fermentation and cell cultivation system. The Winpact serials brand products offer a wide range of fermentation systems and includes many of the most widely applied bench top-sized instruments for the life sciences field. In addition, we also offer innovative general instruments for all of your laboratory needs. Our general instrument product line includes Electrophoresis and Related Products, Gel Documentation System, Blue Light Technology, Mixer / Temperature Control and Peristaltic Pump.

Major Science conducts business via our global distribution partners who also serve as our main sales force. These strategically-located partners ensure that Major Science supplies top-quality products, services, and support to all of our customers in any region of the globe. Products from Major Science are produced under international quality standards and specifications that excel in performance. For more information, please feel free to contact us.

www.majorsci.com
info@majorsci.com

Our History

- 1994 Major Science founded as a biotechnology instrument distributor and provide engineering service in life sciences field.
- 1996 Began to sell Major Science branded general instruments.
- 2000 Announced our Winpact fermentation and cell cultivation product lines.
- 2005 Built up global awareness.
- 2008 Founded branch offices overseas.
- 2013 Accredited to SGS ISO 9001:2008
- 2017 Accredited to SGS ISO 9001:2015
- 2018 Accredited to TQCSI ISO 9001:2015

Current Areas Of Focus

At Major Science, we are developing a comprehensive network of innovative products and services. We are continuously broadening our scope for people researching life sciences to provide an effective source of instrumentation.

Bioprocessing Technology

Bioreactor/Fermentors

Innovative SIP pilot and lab fermentation system suitable for all of your cell culture and fermentation engineering purposes

Cultivation Incubator

The ultimate bench-top model provide the stability and durability for all your fermentation and incubation needs

Life Sciences Research

Electrophoresis and Related Products

Provide excellent equipment for all of your nucleic acid and protein separation experiment

Gel Documentation System

Simple and innovative gel imaging systems and quantification software

Blue Light Technology

A comprehensive safe and environmental friendly blue light technology product range for real time gel observation during/after electrophoresis and gel treatments

Mixer/Temperature Control

A series of simple, compact and innovative incubators with shaking mechanisms for all of your application needs

Peristaltic Pump

Quality digital peristaltic pumps are suitable for various of your application needs

Chemical Engineering

Thermostirrer

Major Science thermostirrer series are equipped with built-in stirrers on the bottom of each well combined with excellent temperature control. A long motor durability product for chemical compound synthesis, combinatorial chemistry, sample concentration, denaturation, derivatization, enzyme analysis and process optimization





*Subjects in picture are not up to scale.

Our Mission

Major Science is devoted to create life sciences research instruments through quality and innovation. Our mission is to deliver integrated laboratory solutions to our customers and distribution partners through collaborative teamwork, thoughtful innovation, practical efficiency and outstanding service.

Our Vision

Major Science is devoted to serving customers in the scientific community across the globe, which means we are constantly progressing toward further innovation and working for wider applications for our products.

Creating innovative cell cultivation solutions is among one of our highest priorities. For the Winpact family product lines, we will be adding vessels that are bigger and smaller in size, as well as pilot and production scale vessels. Furthermore, we are developing the means to create connections from multiple cell culture vessels in different conditions to a single controller. In addition, Major Science is expanding on the cell cultivation line with more optional devices that can be integrated with our current systems. These expansion includes various vessel types, parts, accessories, and sub-systems. We will also embed the use of disposable systems that function with plastic instead of glass vessels.

Our Quality Policy

As of January, 2013. Major Science is accredited to the SGS ISO 9001:2008 compliance.

Major Science strives to achieve high standard for customer satisfaction, we promise to always improve our quality by means of research and development, as well as embrace any challenge come forth within.

Our Capabilities

- Innovative product design from our in-house R&D team
- Flexible production schedules
- ETL certified manufacturing facility
- CE and 3rd party certification
- OEM/ODM production experiences with leading companies
- Global marketing and product support
- Worldwide liability insurance across all product lines

Our Values

Serving our customers

Major Science cares about what you care and we are dedicated to gaining your confidence. Major Science dedicated in providing best efforts to all of our customers' needs whether they are customized products or technical supports or others.

Innovation

Major Science is determined to use not only our expertise in the laboratory, but also the prior experience of our users and employees to breakthrough with the future generations of our cultivation products along with the advancement of all our other products.

Professionalism

Major Science has its own professional Research & Development team of scientists and product specialists that are further supported by an outperforming sales team. We integrate laboratory experiences with customers' feedback in order to ensure the best quality of products and services from the placing of your order to its delivery.

Staying Green, protecting mankind

Major Sciences collaborate with our global distributors to distribute our products to every corner of the world, we take pride and corporate social responsibility of being a good global citizen in ensuring the protection of our environment.

User-friendly Instruments

Major Science offers easy-to-operate and convenient instruments in the world of biotechnology. We provide simple and intuitive methods such as touch-screen and keypads for different applications that are easy to navigate and operate.

Fermentation and Cell Cultivation Technology

Winpact is a product brand under Major Science, which provides a comprehensive and innovative line of cultivation products designed for different cell culture experiments and applications. It comes at a benchtop scale and has a large, color touch-screen panel with a user-friendly interface. Its distinctive functions include various programming operations to control the pump speed, pH levels, temperature, and more. The Winpact Fermentation System comes equipped with a full connection device to connect to any PC for real-time recording and environment control within the vessel.





Winpact Shaker

The WS-200 shaker is developed to offer an integrated solution for every mixing requirement. With a large 18.1"x18.1" platform and a wide selection of labware holders, this versatile machine can accommodate five 2L flasks or any combination of labwares up to 30kg. This powerful machine is equipped with a maintenance-free brushless motor that permits the device to operate noiselessly even at 500rpm under programmable mode of operation or continuous mode up to 999hr.



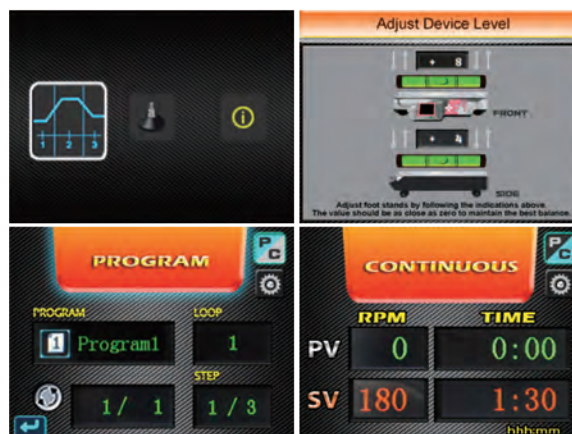
CE WS-200 / WS-201 series

Features

- Various speed settings from 20-500rpm
- Equipped with a robust brushless DC motor for economical and noiseless operation
- Two modes of operation available: programmable or continuous
- Versatile accessories available for advanced culturing solutions
- Auto detection and power shutdown to platform weight imbalance or belt breakage

Specification

Cat. No.	WS-200	WS-201
Description	Winpact Orbital Shaker (universal platform included)	Winpact Orbital Anti-moistured Shaker (universal platform included)
Platform Size	Approx. 18.1"x18.1" (460x460mm)	
Shaking Orbit	Approx. 0.7" (19mm)	
Speed Range	20-500rpm	
Speed Increment	1rpm	
Timer	999 (hr): 59 (min) / Continuous	
Display	3.5" Color TFT LCD screen	
Dimension (WxLxH)	Approx. 20.5"x24.4"x8.3" (520x620x210mm)	
Rated Voltage	100-240V~, 50 / 60Hz, 2A	
Loading Capacity *	Approx. 500rpm: 11" (5kg), 250rpm: 66.1" (30kg)	
Anti-moistured	N/A	Yes
Weight	Approx. 88.2lb (40kg)	



Ordering Information

Cat. No.	Product Description
WS-200	Winpact Orbital Shaker with universal platform included
WS-201	Winpact Orbital Anti-moisture Shaker with universal platform included

Accessories / Racks and Tray

Cat. No.	Product Description	Max. Platform Capacity
SI-200-01	Universal platform	1
SI-200-02	Adjustable angle tube rack (33 x 15 ml)	4
SI-200-03	Adjustable angle tube rack (16 x 50 ml)	4
SI-200-04	Universal spring rack	2
SI-200-05	Sticky pad platform	1
SI-200-06	Universal cushioned crossbar platform	1
PPL-04-SI-SI-200-3	Sticky pad 20x20 cm	4

Microplate and flask holder

Cat. No.	Product Description	Max. Platform Capacity
SI-200-07	Microplate holder	9
SI-200-08	Flask holder, 50 ml	52
SI-200-09	Flask holder, 125 ml	25
SI-200-10	Flask holder, 250 ml	25
SI-200-11	Flask holder, 500 ml	16
SI-200-12	Flask holder, 1000 ml	9
SI-200-13	Flask holder, 2000 ml	5

* Different flask will reduce the maximum speed.

Winpact Shaking Incubator



Acrylic lid for clear viewing and easy access

Major Science is introducing our newly innovated Winpact series shaking incubator. It provides you the stability and durability for all your fermentation and incubation needs. The system incorporate multi-safety features to put you at your ease of mind.



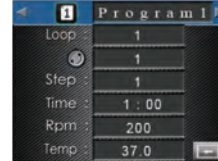
A spare air/gas inlet to create particular environment for specific kinds of cell/microbial

CE SI-200

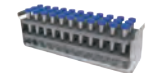
- Special designed drainage channel protects the motor and inner circuitry from accidental spills
- Multiple early error-detection mechanisms ensure operators' safety and completeness of experiment despite malfunction
- Lab-proven superior temperature uniformity
- A wide selection of racks, holders, sticky pads and accessories provides all-ranged compatibility to cell cultivation labwares
- Automatic system shutdown in the event of system over-heating
- Sensitivity adjustable G-sensor with warning embedded for imbalance weight detection
- Programmable or continuous mode for personnel operation
- Brushless DC motor provides long and quiet operation, durable and maintenance-free usage
- Hermetic chamber design significantly reduces operation noise and enhances precise temperature control
- 2-point temperature calibration ensures high temperature performance

Specification

Cat. No.	SI-200
Platform size	18.1" x 18.1" (460 x 460 mm)
Shaking orbit	0.7" (19 mm)
Speed range	20-500 rpm
Speed increment	1 rpm
Communication port	RS-485
External temperature probe	PT-100
Heating temperature range	Ambient +5°C to 65°C
Power	600W
Temp accuracy and uniformity	± 0.25°C at 37°C
Timer	999 (hr) : 59 (min) / Continuous
Display	3.5" Color TFT LCD screen
Dimension (WxLxH)	23.2" x 32.3" x 20.9" (Approx. 590 x 820 x 530 mm)
Weight	154.3 lb (70 kg)
Rated voltage	110 / 220V~, 50 / 60Hz, 6.3A



Universal platform
Cat. No.: SI-200-01



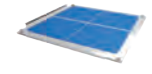
Adjustable angle tube rack (33 x 15 ml)
Cat. No.: SI-200-02
**tube not included*



Adjustable angle tube rack (16 x 50 ml)
Cat. No.: SI-200-03



Universal spring rack
Cat. No.: SI-200-04



Sticky pad platform
Cat. No.: SI-200-05



Universal cushioned crossbar platform
Cat. No.: SI-200-06



Microplate holders
Cat. No.: SI-200-07
(platform not included)



Flask holder
Cat. No.: SI-200-08-13

Ordering Information

Cat. No.	Product Description
SI-200	Winpact Shaking Incubator with universal platform included

Accessories / Racks and Tray

Cat. No.	Product Description	Max. Platform Capacity
SI-200-01	Universal platform	1
SI-200-02	Adjustable angle tube rack (33 x 15 ml)	4
SI-200-03	Adjustable angle tube rack (16 x 50 ml)	4
SI-200-04	Universal spring rack	2
SI-200-05	Sticky pad platform	1
SI-200-06	Universal cushioned crossbar platform	1
PPL-04-SI-SI-200-3	Sticky pad 20x20 cm	4

Microplate and flask holder

Cat. No.	Product Description	Max. Platform Capacity
SI-200-07	Microplate holder	9
SI-200-08	Flask holder, 50 ml	52
SI-200-09	Flask holder, 125 ml	25
SI-200-10	Flask holder, 250 ml	25
SI-200-11	Flask holder, 500 ml	16
SI-200-12	Flask holder, 1000 ml	9
SI-200-13	Flask holder, 2000 ml	5

*Different size of flask holder available as accessories.



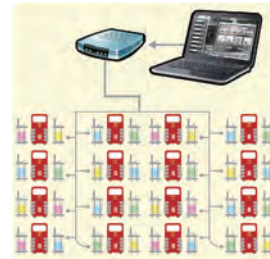
- 1 Single wall dish bottom vessel, 1 L
- 2 Double jacketed dish bottom vessel, 3 L
- 3 Single wall air lifter vessel, 5 L
- 4 Double jacketed air lifter vessel, 5 L

Benchtop System Overview

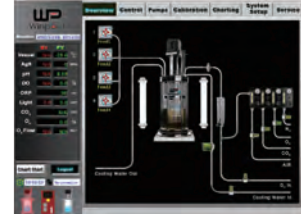
Winpact Parallel System (FS-05 Series)

The Winpact Parallel Fermentation System is the ultimate and true parallel system for your parallel experiment. Whether you need to run two identical experiment or different experiment at the same time, the duo heating system allows you to run two thermostat heating, two dry heating or one thermostat and one dry heating simultaneously. The state of the art design is constructed with the upmost versatility for you to operate any vessel type and size in any combination you like. The remote software can control up to 16 systems (total 32 vessels) for true parallel operation.

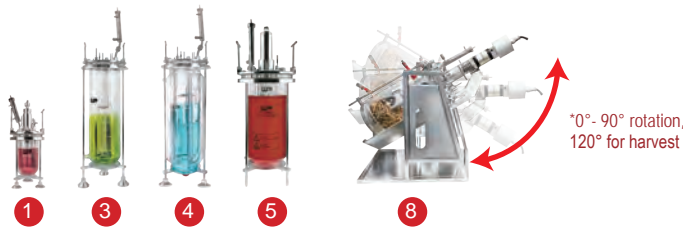
- Duo heating system, thermostat and dry heating combined in one
- True Parallel System, 1 controller controls 2 vessels
- 5 interchangeable types of autoclavable glass vessels
- Control up to 16 systems from a single interface
- Compatible with microbial and cell culture applications
- Intuitive user interface for short learning time
- Ethernet communication with Winpact SCADA software, and IP addressing
- Compatible with vessel volume from 0.5L to 20L
- Full selection of optional devices available
- Auto vessel angle control mechanism for solid state vessel
- Solid state vessel performs 0°- 90° rotation, and 120° for harvest



Remote control software connects up to 16 systems (total 32 vessels) at the same time via PC



Newly developed Winpact interface for easy operation



Winpact One Fermentation System (FS-06 Series)

The most versatile, price and space saving fermentation system is now available from our Winpact fermentation product line-the Winpact One Fermentation System. Winpact One is not only compact in size but also provides all the necessary tools as a standard instrument. The duo heating system allows you to choose any vessel type up to 10L for whichever application needs. The optional expansion module allows you to add additional devices to enhance the capability of the system. All necessities such as temperature, anti-foam, pH and DO probe are included in standard package.

- Duo heating system, thermostat and dry heating combined in one
- Most versatile and compact system on the market (WxLxH) 250x510x500mm
- 4 interchangeable types of autoclavable glass vessels
- Control up to 16 systems from a single interface
- Compatible with microbial and cell culture applications
- Intuitive user interface for self-explanatory time with multi-language support
- Ethernet communication with Winpact SCADA software, and IP addressing
- Expansion module available for system upgrade for optional devices



- 5 Single wall dish bottom vessel with heating blanket, 5 L
- 7 Double jacketed dish bottom vessel, 500 ml
- 6 Single wall plain bottom vessel with heating base unit, 10 L
- 8 Solid State, 5 L

Winpact Evo Fermentation System (FS-07 Series)

Winpact Evo System is a one-side version of Winpact Parallel System yet offers cutting edge software. It retains all the features from FS-05 such as duo heating system, 16-system control from a remote computer, 5 types of autoclavable glass vessels ranging from 0.5L to 20L. We also significantly enhanced the functionalities and capabilities of its newly developed controller, including the versatility to accommodate solid state system.

- Intuitive user-interface for learnable operation time with multi-language support
- Ethernet communication with Winpact SCADA software, and IP addressing
- Winpact EZScript software for advance fermentation process (optional)
- Control up to 16 systems from a single interface on external PC
- Duo heating system, thermostat and dry heating all combined in one
- Compatible with microbial and cell culture applications
- 5 interchangeable types of autoclavable glass vessels
- Auto vessel angle control mechanism for solid state vessel
- Solid state vessel performs 0°- 90° rotation, and 120° for harvesting



*For more information, please contact your local distributors.



Winpact Mass Flow Controller (FS-O-MF series, optional)

The gas composition is important for microorganism/cell culture. To maintain different gases at a defined flow rate during bioprocesses, Winpact Mass Flow Controller can provide accurate and stable flow measurement and control.

Mass flow controller (MFC) is a precise device which is used to control a specific type of liquid or gas at a particular range of flow rates. MFC is composed of block, flow-splitter or bypass, sensor, printed circuit board (PCB), and control valves.

When gas flows into MFC, the sensor will detect its real volume and compare with the setting value (standard value), if the detection value is lower than setting value, the inner control valve will open slightly for increasing the input flow; conversely, if the detection value is higher than the setting value, the inner control valve will close slightly for reducing the input flow, for this reason, MFC is able to adjust the flow automatically and more accurately.

Besides this, overlay (headspace aeration) control is also useful for fermentation process. Winpact Mass Flow Controller also can sparge different gases into the reactor though the headspace and the sparger at the same time.

Now, Winpact Mass Flow Controller could be integrated into Winpact Fermentation system and achieve operational efficiency and creative stable environment in culture conditions.

- Affordable price
- Self-made, high quality accurate gas control guarantee

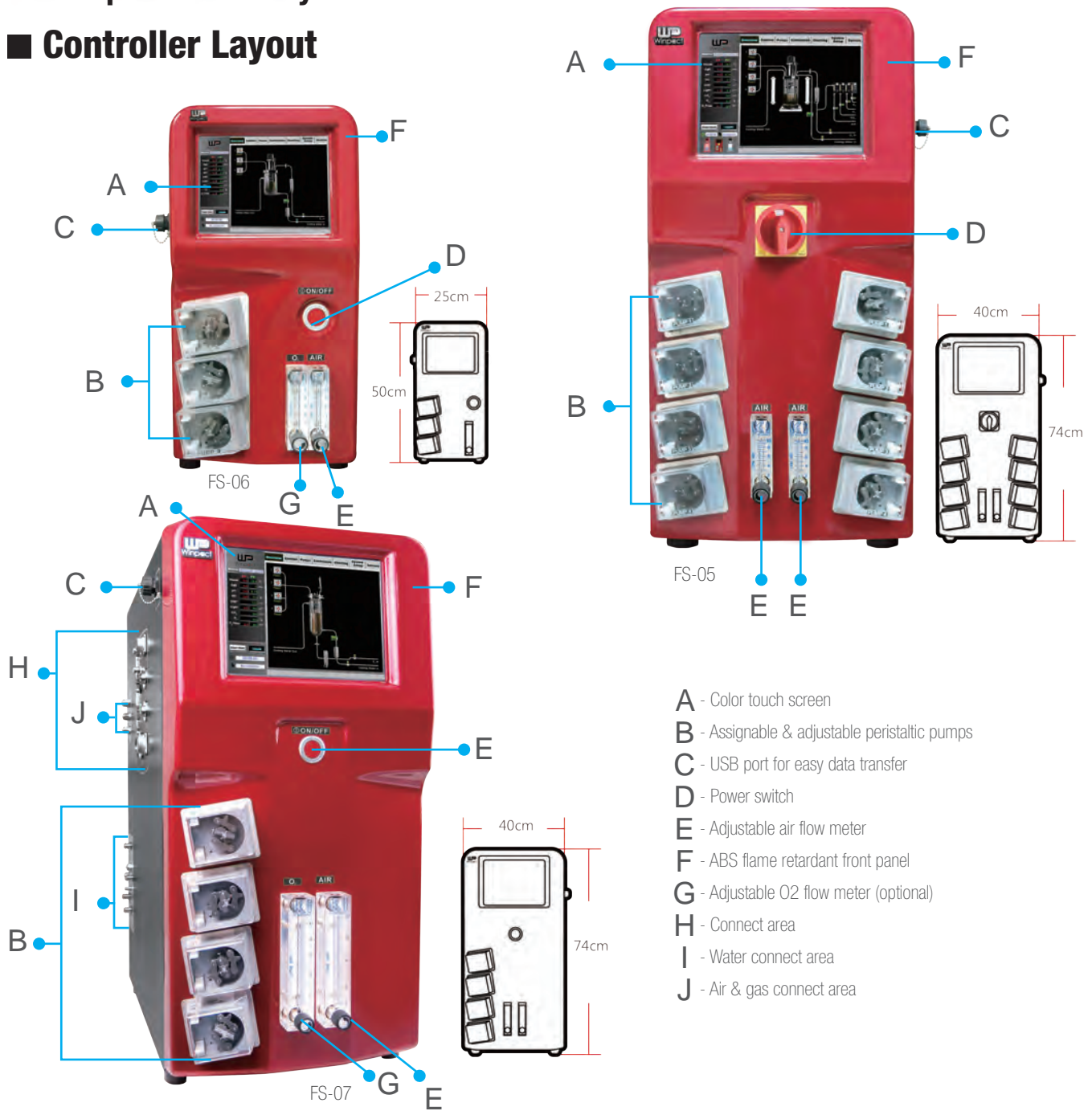


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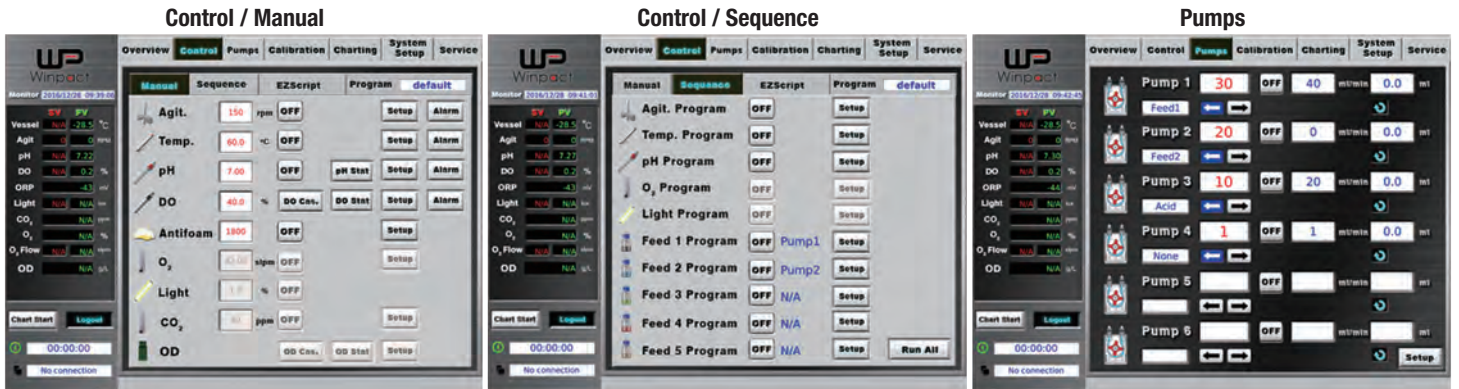


Winpact Control System

Controller Layout



- A - Color touch screen
- B - Assignable & adjustable peristaltic pumps
- C - USB port for easy data transfer
- D - Power switch
- E - Adjustable air flow meter
- F - ABS flame retardant front panel
- G - Adjustable O2 flow meter (optional)
- H - Connect area
- I - Water connect area
- J - Air & gas connect area



Perform manual, sequence or EZScript control (optional) of each parameter

Control the peristaltic pump speed, direction, total volume and flow rate



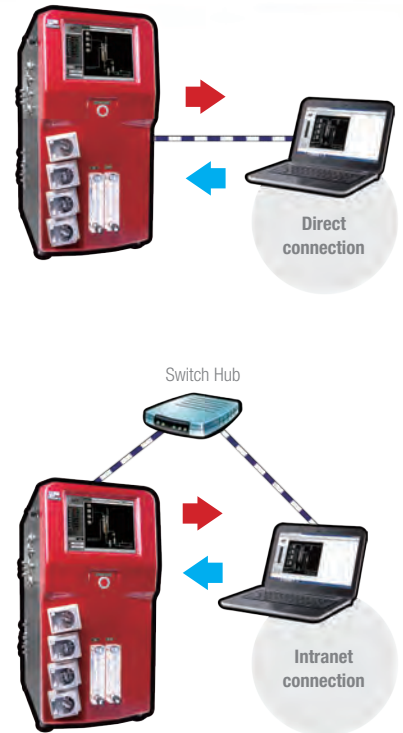
PC remote controlling software connects up to 16 systems

Overall Features:

- Duo heating system, thermostat and dry heating combined in one
- Interchangeable 5 types of autoclavable glass vessels
- Compatible with a total of 20 vessels, working volume range of 500ml-20L on a single controller.
- Compatible with microbial and cell culture applications
- Highly acid and base resistant Watson Marlow pump heads
- Flexibility in data exporting, USB or PC connection
- Easy maintenance and upgrade modular system
- No software purchase necessary
- Ethernet cable connection for remote control
- Quality assurance- CE certified and ISO accredited

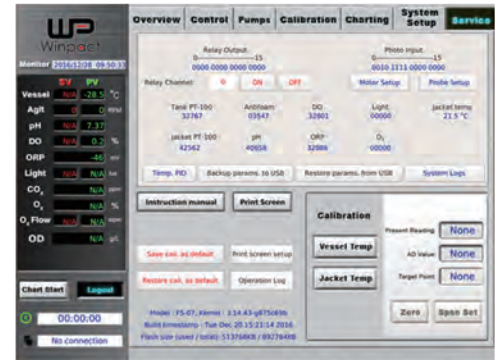
Software Features:

- Linux based system for stable and virus proof operation
- 15-step sequential control for pH, temperature., agitation and feeding program
- Intuitive user-interface for short learning time with multi-language support
- Over 59,994 user programs and 100 process data files can be stored in controller
- pH and DO stat with smart feeding technology
- 8 user accounts with secure password for maximum protection
- Real-time on-screen data viewing, recording and exporting ensures quick data analysis
- Ethernet communication with Winpact SCADA software, and IP addressing
- Winpact EZScript software for advanced fermentation process (optional)



*PC and switch hub are not included

Service



Professional parameters for fast maintenance and troubleshooting

Calibration



Easy operate on-screen sensor calibration with help menu

Charting



Real-time data recording and exporting during a fermentation process with image capture capability (NEW)

System Setup



Intuitive system set up for optional devices and administration



Winpact Parallel Fermentation System



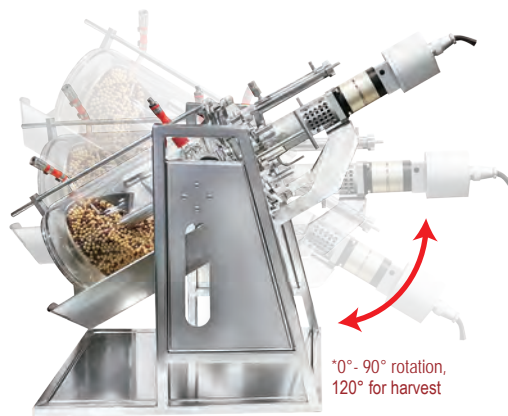
10L Single Wall Vessel with Heating Base Unit



FS-05



1L Double Jacketed Vessel



Solid state, 5L (FS-V-SA05P)

*0°- 90° rotation, 120° for harvest

System Specification

* All images are for reference only, actual products might differ from the pictures above.

Controller	Duo heating system controller					
	Built-in rotameter					
8 built-in pump heads						
Vessel	Double Jacketed Dish Bottom Vessel (includes glass body, head plate, T-handling bar, 2 probe adaptors)	Single Wall Dish Bottom Vessel (includes glass body, head plate, T-handling bar, 2 probe adaptors)	Air Lifter Vessel (includes glass body, head plate, draft tube, T-handling bar, 2 probe adaptors)	Single Wall Dish Bottom Vessel with Heating Blanket (includes glass body, head plate, T-handling bar, 2 probe adaptors and heating blanket)	Single Wall Plain Bottom Vessel with Heating Base Unit (includes glass body, head plate, T-handling bar, 2 probe adaptors and heating base unit)	Solid State (FS-V-SA05P)
	Rushton-type impellers		No impellers	Rushton-type impellers		Multi-Type
	Baffle assembled		Draft tube assembled	Baffle assembled		N / A
	Condenser assembled					
	Air sparger assembled		Micro sparger assembled	Air sparger assembled		
Agitation motor	Brushless motor		N / A	Brushless motor		Brushless motor
Probes	1x pH probe and 1x probe cable					Optional
	1x DO probe and 1x probe cable					Optional
	1x Temperature probe and 1x probe cable					
Start-up kit	1x anti-foam/level sensor and 1x probe cable					N / A
Start-up kit	Complete start-up kit includes silicone tubes, tube clamps, metal connector and autoclavable disc filters. Please see p.35 for details.					

Vessel Specification

Vessel	Double Jacketed (FS-V-A series)					Single Wall (FS-V-B series)				Air Lifter (FS-V-C series)
Working volume	500 ml	1 L	3 L	5 L	10 L	1 L	3 L	5 L	10 L	5 L
Total volume	1 L	1.5 L	3.8 L	6.8 L	12.5 L	1.5 L	3.8 L	6.8 L	12.5 L	7 L
Vessel	Single Wall with Heating Blanket (FS-V-B series)					Single Wall with Heating Base Unit (FS-V-D series)				
Working volume	1 L	3 L	5 L	10 L	15 L	20 L	3 L	5 L	10 L	
Total volume	1.5 L	3.8 L	6.8 L	12.5 L	18.7 L	23.7 L	3.7 L	6.7 L	13.1 L	

*All vessels are made of borosilicate glass and 316L stainless steel for headplate and all fittings.

Utility Requirement

Power source	210-230V, 50-60Hz with electrical safety cutoff switch
Water source	0.4-1 bar (5.8-14.5 psi); water supplied to fermentors should be at least 15°C below the set operating temperature
Air source	0.5-2 bar, must be dry, oil-free and filtered.
Sterilization	Autoclave; size of the autoclave's inner chamber must be able to accommodate vessel with condenser attached

**The minimum speed varies from 1-5 rpm depending on actual medium viscosity.
 * Gas flowrate may be affected by pressure, liquid volume, solution type and characteristic, filter.
 For 15L & 20L glass vessel, we suggest to using optional capsule filter for reach the desired gas flowrate(2 vvm).

Specification

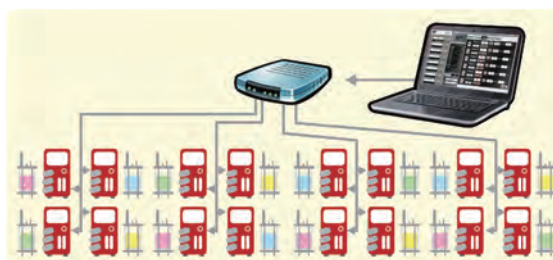
Control unit	Control panel	10.4" Color touch-screen interface	
	Communication port	Remote software control through Ethernet, up to 16 systems per PC	
		Data export through USB port Analog AUX port for system extension	
	Program storage	Up to 59,994 process programs	
	Log data storage	Up to 100 process monitoring data files	
	Cabinet material	ABS front panel and painted iron housing	
	Dimension	Footprint: W x L = 15.75" x 21.61" (400 mm x 549 mm); Height: 29.14" (740 mm)	
	Rated voltage	220V~; 50/60 Hz, 10A, 2000W	
Weight	Approx. 114.6 lb (52 kg)		
Aeration	Inlet gas flow-meter	0,0.1-1 LPM (500 ml); 0, 0.2-2.5 LPM (1 L); 0, 1-10 LPM (3, 5 L); 0, 2-25 LPM (10 L); 0, 6-50 LPM (15, 20 L)	
	Sparger	L-shape (500ml, 1L); Ring sparger (3L and above); Micro-sparger (C type vessels); Center-located sparger (solid state)	
	Baffle	316L stainless steel baffles; 0.5-3L vessel: fixed, unmovable; 5L and above vessel: removable	
Temperature	Heating	1. Thermostat system: built-in heat exchanger (550W heater, water circulation pump) 2. Dry heating system : external devices (heating blanket or heating base unit)	
	Cooling	Built-in water module and external water circulator (optional)	
	Range	- FS-V-A/ B / SA05P series: 5°C (41°F) above coolant up to 60°C (140°F)	
		- FS-V-C series (Double Jacketed): 5°C (41°F) above coolant up to 60°C (140°F)	
		- FS-V-C series (Single Wall): without temp control - FS-V-D series : 5°C (41°F) above coolant up to 90°C (194°F)	
	Probe	Platinum RTD probe (PT-100), non autoclavable	
Control mode	Manual or programmable 15-step PID control		
Agitation	Drive	Removable top brushless motor	
	Speed range	a. For Pitched blade impeller: 30-300 rpm b. For Rushton impeller: 30-1800 rpm(0.5, 1L); 30-1200 rpm(3, 5L); 30-1000 rpm(10L); 30-700 rpm(15, 20L) c. For Broken type/Spiral type/Anchor type impellers (only for FS-V-SA05 vessel): 1 – 60 rpm**	
		Resolution	1 rpm increment
		Impeller	2 impellers for 0.5-1 L vessel and 0.5-5 L Double Jacketed Vessel 3 impellers for 3 L vessel and above; for 10 L Double Jacketed Vessel Note: customized impellers are available upon ordering
	Control mode	Manual or programmable 15-step PID control with adjustable deadband	
	pH	Range	0 -14 (2-12 for maximum precision)
Resolution		0.01 pH	
Probe		Gel-filled electrode, autoclavable	
Control mode		Manual/acid start/programmable 15-step PID control	
DO	Range	0-200%, Control range: 0-100%, adjustable	
	Resolution	0.1%	
	Probe	Polarographic DO sensor; autoclavable	
	Control mode	2-stage DO cascade response a. Increase or decrease agitation speed b. Supply external oxygen source (Gas Inlet Control Module required, optional device) c. Adjust DO level using gas mixing control (gas mixing station module required, optional device) - Substrate feeding strategy - DO Stat with smart feeding technology	
ORP (optional)	Measurement range	± 2000 mV	
	Resolution	1 mV	
	Probe	Gel-filled electrode: autoclavable	
Foam / level	Probe	316L stainless steel protector with insulated PTFE tube; autoclavable, adjustable sensitivity control	
	Control mode	Foam: on/off switch; Level: on/off switch control with wet/dry probe set up	
Peristaltic pump	Pump number	4 built-in Watson Marlow pumps per vessel (total 8); Total 4 external pumps expandable: - 2 external pumps: MU-D series required (optional) - 2 external pumps: 4-20mA or DC 0-10V analog input	
		Motor type	Precise stepping motor; minimum speed is 1 rpm
		Speed range	0, 1-65rpm
	Resolution	1 rpm	
	Control mode	Manual or programmable 15-step feeding control; pump can be assigned for acid,base,antifoam and substrate	
Exhaust	Device type	316L stainless steel condenser	



Winpact One Fermentation System



FS-06



Remote control software connects up to 16 systems (16 vessels) at the same time via PC



Compatible with any vessel types up to 10 liter

System Specification

Controller	Duo heating system controller				
	Built-in rotameter				
	3 built-in pump heads				
Vessel	Double Jacketed Dish Bottom Vessel (includes glass body, head plate, T-handling bar, 2 probe adaptors)	Single Wall Dish Bottom Vessel (includes glass body, head plate, T-handling bar, 2 probe adaptors)	Air Lifter Vessel (includes glass body, head plate, draft tube, T-handling bar, 2 probe adaptors)	Single Wall Dish Bottom Vessel with Heating Blanket (includes glass body, head plate, T-handling bar, 2 probe adaptors and heating blanket)	Single Wall Plain Bottom Vessel with Heating Base Unit (includes glass body, head plate, T-handling bar, 2 probe adaptors and heating base unit)
	Rushton-type impellers		No impellers	Rushton-type impellers	
	Baffle assembled		Draft tube assembled	Baffle assembled	
	Condenser assembled				
Agitation motor	Air sparger assembled		Micro sparger assembled	Air sparger assembled	
	Brushless motor		N / A	Brushless motor	
Probes	1x pH probe and 1x probe cable				
	1x DO probe and 1x probe cable				
	1x Temperature probe and 1x probe cable				
	1x Anti-foam/level sensor and 1x probe cable				
Start-up kit	Complete start-up kit includes silicone tubes, tube clamps, metal connector and autoclavable disc filters. Please see p.35 for details.				

* For FS-V-A, FS-V-B and FS-V-D series, the standard impeller is Rushton-type; pitched blade is available for cell culture upon request.

Vessel Specification

Vessel	Double Jacketed (FS-V-A series)					Single Wall (FS-V-B series)				Air Lifter (FS-V-C series)
Working volume	500 ml	1 L	3 L	5 L	10 L	1 L	3 L	5 L	10 L	5 L
Total volume	1 L	1.5 L	3.8 L	6.8 L	12.5 L	1.5 L	3.8 L	6.8 L	12.5 L	7 L
Vessel	Single Wall with Heating Blanket (FS-V-B series)				Single Wall with Heating Base Unit (FS-V-D series)					
Working volume	1 L	3 L	5 L	10 L	3 L	5 L	10 L			
Total volume	1.5 L	3.8 L	6.8 L	12.5 L	3.7 L	6.7 L	13.1 L			

*All vessels are made of borosilicate glass and 316L stainless steel for headplate and all fittings.

Utility Requirement

Power source	100-120V / 210-230V, 50-60Hz with electrical safety cutoff switch
Water source	0.4-1 bar (5.8-14.5 psi); water supplied to fermentors should be at least 15°C below the set operating temperature
Air source	0.5-2 bar, must be dry, oil-free and filtered
Sterilization	Autoclave; size of the autoclave's inner chamber must be able to accommodate vessel with condenser attached

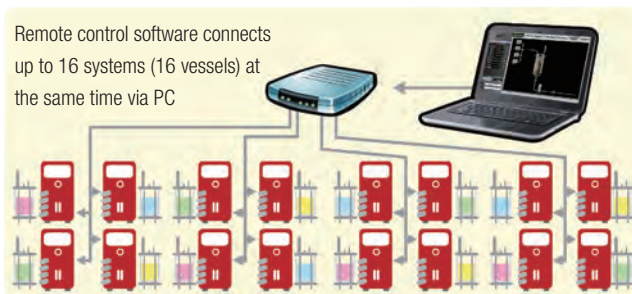
Specification

** Expansion module (FS-06-EPM) required.

Control unit	Control panel	8" Color touch-screen interface
	Communication port	Remote software control through Ethernet, up to 16 systems per PC
		Data export through USB port
		Analog AUX port for system extension
	Program storage	Up to 59,994 process programs
	Log data storage	Up to 100 process monitoring data files
	Cabinet material	ABS front panel and painted iron housing
	Dimension	Footprint: W x L = 9.84" x 20.08" (250 mm x 510 mm), Height: 19.69" (500 mm)
Rated voltage	110V~/220V; 50/60 Hz, 10A	
Weight	Approx. 61.73 lb (28 kg)	
Aeration	Inlet gas flow-meter	0,0.1-1 LPM (0.5 L), 0, 0.2-2.5 LPM (1 L), 0, 1-10 LPM (3, 5 L), 0, 2-25 LPM (10 L)
	Sparger	L-shape (500ml, 1L); Ring sparger (3L and above); Micro-sparger (C type vessels)
	Baffle	316L stainless steel baffles; 0.5-3L vessel: fixed, unmovable; 5L and above vessel: removable
Temperature	Heating	1. Thermostat system: built-in heat exchanger (550W heater, water circulation pump) 2. Dry heating system (heating blanket or heating base unit)
	Cooling	Built-in water module and external water circulator (optional)
	Range	- FS-V-A/ B series: 5°C(41°F) above coolant up to 60°C(140°F) - FS-V-C series (Double Jacketed): 5°C (41°F) above coolant up to 60°C (140°F) - FS-V-C series (Single Wall): without temp control - FS-V-D series : 5°C(41°F) above coolant up to 90°C (194°F)
	Probe	Platinum RTD probe (PT-100), non autoclavable
	Control mode	Manual or programmable 15-step PID control
Agitation	Drive	Removable top brushless motor
	Speed range	a. For Pitched blade impeller: 30-300 rpm b. For Rushton impeller: 30-1800 rpm(0.5, 1L); 30-1200 rpm(3, 5L); 30-1000 rpm(10L)
	Resolution	1 rpm increment
	Impeller	2 impellers for 0.5-1 L vessel and 0.5-5 L Double Jacketed Vessel;3 impellers for 3 L vessel and above; for 10 L Double Jacketed Vessel; Note: customized impellers are available upon ordering
	Control mode	Manual or programmable 15-step PID control
pH	Range	0 -14 (2-12 for maximum precision)
	Resolution	0.01 pH
	Probe	Gel-filled electrode, autoclavable
	Control mode	Manual/acid start/programmable 15-step PID control with adjustable deadband **pH Stat with smart feeding technology
DO	Range	0-200%, Control range: 0-100%, adjustable
	Resolution	0.1%
	Probe	Polarographic DO sensor; autoclavable
	Control mode	DO cascade response: 1-stage or 2-stage** a. Increase or decrease agitation speed **b. Supply external oxygen source (Gas Inlet Control Module required, optional device) **c. Adjust DO level using gas mixing control (gas mixing station module required, optional device) Substrate feeding strategy **DO Stat with smart feeding technology
ORP(optional)**	Measurement range	± 2000 mV
	Resolution	1 mV
	Probe	Gel-filled electrode: autoclavable
Foam / level	Probe	316 L stainless steel protector with insulated PTFE tube, autoclavable, adjustable sensitivity control
	Control mode	Foam: on/off switch Level: on/off switch control with wet/dry probe set up
Peristaltic pump	Pump number	3 built-in Watson Marlow pumps; 1 external pump expandable: MU-D series required (optional); **2 external pumps expandable: -1 external pump: MU-D series required (optional) -1 external pump: 4-20mA or DC 0-10V analog input
	Motor type	Precise stepping motor; minimum speed is 1 rpm
	Speed range	0, 1-65rpm
	Resolution	1rpm
	Control mode	Manual or programmable 15-step feeding control; pump can be assigned for acid, base, antifoam and substrate; **flow rate & total volume calculation
Exhaust	Device type	316 L stainless steel condenser



Winpact Evo Fermentation System



System Specification

Controller	Duo heating system controller					
	Built-in rotameter					
	4 built-in pump heads					
Vessel	Double Jacketed Dish Bottom Vessel (includes glass body, head plate, T-handling bar, 2 probe adaptors)	Single Wall Dish Bottom Vessel (includes glass body, head plate, T-handling bar, 2 probe adaptors)	Air Lifter Vessel (includes glass body, head plate, draft tube, T-handling bar, 2 probe adaptors)	Single Wall Dish Bottom Vessel with Heating Blanket (includes glass body, head plate, T-handling bar, 2 probe adaptors and heating blanket)	Single Wall Plain Bottom Vessel with Heating Base Unit (includes glass body, head plate, T-handling bar, 2 probe adaptors and heating base unit)	Solid State (FS-V-SA05P)
	Rushton-type impellers		No impellers	Rushton-type impellers		Multi-Type
	Baffle assembled		Draft tube assembled	Baffle assembled		N / A
	Condenser assembled					
	Air sparger assembled		Micro sparger assembled		Air sparger assembled	
Agitation motor	Brushless motor		N / A		Brushless motor	Brushless motor
Probes	1x pH probe and 1x probe cable					Optional
	1x DO probe and 1x probe cable					Optional
	1x Temperature probe and 1x probe cable					
	1x anti-foam/level sensor and 1x probe cable					N / A
Start-up kit	Complete start-up kit includes silicone tubes, tube clamps, metal connector and autoclavable disc filters. Please see p.35 for details.					

Vessel Specification

Vessel	Double Jacketed (FS-V-A series)					Single Wall (FS-V-B series)				Air Lifter (FS-V-C series)
Working volume	500 ml	1 L	3 L	5 L	10 L	1 L	3 L	5 L	10 L	5 L
Total volume	1 L	1.5 L	3.8 L	6.8 L	12.5 L	1.5 L	3.8 L	6.8 L	12.5 L	7 L

Vessel	Single Wall with Heating Blanket (FS-V-B series)					Single Wall with Heating Base Unit (FS-V-D series)			Solid State (FS-V-SA05P)	
Working volume	1 L	3 L	5 L	10 L	15 L	20 L	3 L	5 L	10 L	5 L
Total volume	1.5 L	3.8 L	6.8 L	12.5 L	18.7 L	23.7 L	3.7 L	6.7 L	13.1 L	6.8 L

*All vessels are made of borosilicate glass and 316L stainless steel for headplate and all fittings.

Utility Requirement

Power source	100-120V / 210-230V, 50-60Hz with electrical safety cutoff switch
Water source	0.4-1 bar (5.8-14.5 psi); water supplied to fermentors should be at least 15°C below the set operating temperature
Air source	0.5-2 bar, must be dry, oil-free and filtered
Sterilization	Autoclave; size of the autoclave's inner chamber must be able to accommodate vessel with condenser attached

**The minimum speed varies from 1-5 rpm depending on actual medium viscosity.
 *Gas flowrate may be affected by pressure, liquid volume, solution type and characteristic, filter.
 For 15L & 20L glass vessel, we suggest to using optional capsule filter for reach the desired gas flowrate(2 vvm).

Specification

Control unit	Control panel	10.4" color touch-screen Interface (Resolution: 800 x 600 pixels)
	Communication port	Remote software control through Ethernet, up to 16 systems per PC
		Data export through USB port
		Analog AUX port for system extension
	Program storage	Up to 59,994 programs for different kinds of condition
	Log data storage	Up to 100 process monitoring data files
	Cabinet material	ABS front panel and painted iron housing
	Dimension	Footprint: W x L = 15.75" x 23.62" (400 mm x 600 mm); Height: 29.14" (740 mm)
Rated voltage	110V~/220V~; 50/60 Hz, 10A	
Weight	Approx. 88.18 lb (40 kg)	
Aeration	Inlet gas flow-meter	0, 0.4-5 LPM (0.5, 1 L); 0, 1-10 LPM (3, 5 L); 0, 2-20 LPM (10 L); 0, 4-50 LPM (15, 20 L)
	Sparger	L-shape (500ml, 1L); Ring sparger (3L and above); Micro-sparger (C type vessels); Center-located sparger (solid state)
	Baffle	316L stainless steel baffles; 0.5-3L vessel: fixed, unmovable; 5L and above vessel: removable
Temperature	Heating	1. Thermostat system: built-in heat exchanger (550W heater, water circulation pump) 2. Dry heating system (heating blanket or heating base unit)
	Cooling	Built-in water module and external water circulator (optional)
	Range	- FS-V-A/ B / SA05P series: 5°C (41°F) above coolant up to 60°C (140°F) - FS-V-C series (Double Jacketed): 5°C (41°F) above coolant up to 60°C (140°F) - FS-V-C series (Single Wall): without temp control - FS-V-D series : 5°C (41°F) above coolant up to 90°C (194°F)
	Probe	Platinum RTD probe (PT-100), non autoclavable
	Control mode	Manual or programmable 15-step PID control
Agitation	Drive	Removable top brushless motor (M3 for 0.5 L, 1 L; M2 for 3~20 L; M4 for solid state)
	Speed range	a. For Pitched blade impeller: 30-300 rpm b. For Rushton impeller: 30-1800 rpm(0.5, 1L); 30-1200 rpm(3, 5L); 30-1000 rpm(10L); 30-700 rpm (15, 20L) c. For Broken type/Spiral type/Anchor type impellers (only for FS-V-SA05 vessel): 1 – 60 rpm**
	Resolution	1rpm increment
	Impeller	2 impellers for 0.5 L & 1 L vessel and 0.5-5 L Double Jacketed Vessel 3 impellers for 3 L vessel and above; for 10 L Double Jacketed Vessel Note: customized impellers are available upon ordering
	Control mode	Manual or programmable 15-step PID control
pH	Range	0 -14 (2-12 for maximum precision)
	Resolution	0.01 pH
	Probe	Gel-filled electrode, autoclavable
	Control mode	Manual/programmable 15-step PID control with adjustable deadband; pH Stat with smart feeding technology
DO	Range	0-200%, Control range: 0-100%, adjustable
	Resolution	0.10%
	Probe	Polarographic DO sensor; autoclavable
	Control mode	2-stage DO cascade response a. Increase or decrease agitation speed b. Supply external oxygen source (Gas Inlet Control Module required, optional device) c. Adjust DO level using gas mixing control (gas mixing station module required, optional device) Substrate feeding strategy; DO Stat with smart feeding technology
ORP(optional)	Measurement range	± 2000 mV
	Resolution	1 mV
	Probe	Gel-filled electrode: autoclavable
Foam / level	Probe	316 L stainless steel protector with insulated PTFE tube, autoclavable, adjustable sensitivity control
	Control mode	Foam: on/off switch; Level: on/off switch control with wet/dry probe set up
Peristaltic pump	Pump number	4 built-in pumps, 2 external pumps expandable: -1 external pump: MU-D series required (optional) -1 external pump: 4-20mA or DC 0-10V analog input
	Motor type	Precise stepping motor; minimum speed is 1 rpm
	Speed range	0, 1-65rpm
	Resolution	1 rpm
Control mode	Manual or programmable 15-step feeding control; pump can be assigned for acid, base, antifoam and/or substrate; pump can calculate flow rate and total volume	
Exhaust	Device type	316L stainless steel condenser



Winpact Controller / Vessel Selection Guide

Controller Specification

Controller	Duo Heating Control (FS-05, FS-06, FS-07)					
Vessel	Double Jacketed (FS-V-A series)	Single Wall (FS-V-B series)	Air Lifter (FS-V-C series)	Single Wall with Heating Blanket (FS-V-B series)	Single Wall with Heating Base Unit (FS-V-D series)	Solid State (FS-V-SA05P)
Agitation Motor	Brushless motor	Brushless motor	N/A	Brushless motor	Brushless motor	Brushless motor
Impeller*	*Rushton-type; Pitched-blade	*Rushton-type; Pitched-blade	N/A	*Rushton-type; Pitched-blade	*Rushton-type; Pitched-blade	Broken type; Anchor type; Spiral type
Temp Range	5 °C above coolant to 60°C	5 °C above coolant to 60°C	Double Jacketed: 5°C above coolant to 60°C Single Wall: without temp control	5°C above coolant to 60°C	5°C above coolant to 90°C	5°C above coolant to 60°C
Vessel Size	500ml - 10L	1 - 10L	5L only, single wall or double jacketed	1 - 20L	3 - 10L	5L only
Speed Range	*Rushton type 30-1800 rpm(0.5, 1L); 30-1200 rpm(3, 5L); 30-1000 rpm(10L) Pitched blade 30-300 rpm	*Rushton type 30-1800 rpm(1L); 30-1200 rpm(3, 5L); 30-1000 rpm(10L) Pitched blade 30-300 rpm	N/A	*Rushton type 30-1800 rpm(1L); 30-1200 rpm(3, 5L); 30-1000 rpm(10L); 30-700 rpm(15, 20L) Pitched blade 30-300 rpm	*Rushton type 30-1200 rpm(3, 5L); 30-1000 rpm(10L) Pitched blade 30-300 rpm	1-60rpm <i>*The minimum speed varies from 1-5 rpm depending on actual medium density.</i>
Heating	Built-in heat exchanger			Heating blanket	Heating base unit	Built-in heat exchanger
Cooling	External chiller, automatic cooling water valve					
Aeration	L-shape or ring sparger	L-shape or ring sparger	Micro-sparger	L-shape or ring sparger	L-shape or ring sparger	Center-located sparger
Grounding Port	No need	No need	Yes	No need	No need	No need
Application	Excellent for temperature sensitive and shear-force sensitive cells such as mammalian and insect cell culture	Great for aerobic or anaerobic microbial culture; suitable for plant cell and photosynthesis cell culture	Excellent for shear-sensitive cells; ideal for plant cells, fungal cells, algae cell and photosynthesis cell culture	Ideal for rapid temperature change aerobic and anaerobic microbial (bacteria and yeast) fermentation	Excellent for aerobic and anaerobic microbial (bacteria, yeast) culture, such as E.coli	Special for the culture of microbial in substrates with low water levels condition , generally suitable for fungi, such as filamentous fungi

*For FS-V-A, FS-V-B and FS-V-D series, the standard impeller is Rushton type; Pitched blade is available for cell culture upon request.

Winpact Controller Selection Guide

Model	FS-05	FS-06	FS-06 + FS-06EPM*	FS-07
Product Name	Winpact Parallel	Winpact One	Winpact One	Winpact Evo
Heating System	Duo heating			
Working Volume Range	500ml - 20L	500ml - 10L	500ml - 10L	500ml - 20L
Autoclavable Glass Vessels	Yes			
Interchangeable Vessels	Compatible with all types of vessel, except for 5L solid state which is only usable with FS-05 and FS-07			
Number Of Vessels Controlled Per Controller	2	1	1	1
Number Of Vessels Controlled Via Remote Software	Max 32	Max 16	Max 16	Max 16
Touchscreen Controller	10.4"	8"	8"	10.4"
Number Of Peristaltic Pumps	8	3	3	4
Gas Mixing Options	Available	No	Available, *	Available
Gas Inlet Control Module	Available	No	Available, *	Available
Mass Flow Controller	Available	No	No	Available
Off Gas Analyzer	Available	No	No	Available
ORP Probe	Available	No	Available, *	Available
Lighting Module	Available	No	Available, *	Available
External Pump	4 max.	1 max.	2 max.	2 max.
Solid State	Available	No	No	Available

* Optional expansion module (FS-06-EPM) needed.

Vessel Specification

	Vessel type	Double Jacketed Dish Bottom Vessel (FS-V-A series)					
	Material	Borosilicate glass / 316L stainless steel for headplate and all fittings (H:D ratio: 2:1)					
	Working volume **	500ml	1L	3L	5L	10L	
	Total volume Δ	1L	1.5L	3.8L	6.8L	12.5L	
	Vessel type	Single Wall Dish Bottom Vessel (FS-V-B series)					
	Material	Borosilicate glass / 316L stainless steel for headplate and all fittings (H:D ratio: 2:1)					
	Working volume **	1L	3L	5L	10L		
	Total volume Δ	1.5L	3.8L	6.8L	12.5L		
	Vessel type	Air Lifter Vessel (FS-V-C series)					
	Material	Borosilicate glass / 316L stainless steel for headplate and all fittings (H:D ratio: 3:1)					
	Working volume **	5L single wall			5L double jacketed		
	Total volume Δ	7L					
	Vessel type	Single Wall Dish Bottom Vessel With Heating Blanket (FS-V-B series)					
	Material	Borosilicate glass / 316L stainless steel for headplate and all fittings (H:D ratio: 2:1)					
	Working volume **	1L	3L	5L	10L	15L	20L
	Total volume Δ	1.5L	3.8L	6.8L	12.5L	18.7L	23.7L
	Vessel type	Single Wall Plain Bottom Vessel With Heating Base Unit (FS-V-D series)					
	Material	Borosilicate glass / 316L stainless steel for headplate and all fittings (H:D ratio: 2:1)					
	Working volume **	3L		5L		10L	
	Total volume Δ	3.7L		6.7L		13.1L	
	Vessel type	Solid State (FS-V-SA05P)					
	Material	Borosilicate glass / 316L stainless steel for headplate and all fittings					
	Working volume **	5L					
	Total volume Δ	6.8L					

** Suggested Max.

Δ Total volumes are approximate and may vary slightly.

Vessel Application

Application \ Vessel	FS-V-A series	FS-V-B series	FS-V-C series	FS-V-B series	FS-V-D series	FS-V-SA05P
	Double Jacketed Dish Bottom Vessel	Single Wall Dish Bottom Vessel	Air Lifter Vessel	Single Wall Dish Bottom Vessel with Heating Blanket	Single Wall Plain Bottom Vessel with Heating Base Unit	Solid State
Mammalian cell culture	● ●	● ○	○ ○	● ●	○ ○	○ ○
Aerobic microorganism culture (Note 1)	● ●	● ●	● ●	● ●	● ●	○ ○
Micro-aerobic microorganism culture (Note 2)	● ●	● ●	○ ○	● ●	● ●	○ ○
Anaerobic microorganism culture (Note 3)	● ●	● ●	○ ○	● ●	● ●	○ ○
Fragile cell culture (Note 4)	● ●	● ○	● ●	● ○	○ ○	○ ○
Photosynthesis cell culture (Note 5)	● ○	● ●	● ●	○ ○	● ○	○ ○
Plant cell culture	● ○	● ○	● ●	○ ○	○ ○	○ ○
Insect cell culture	● ●	● ○	○ ○	● ○	○ ○	○ ○
Solid state / semi-solid state	○ ○	○ ○	○ ○	○ ○	○ ○	● ●

● ● Excellent ● ○ Good ○ ○ Not recommended

Note:

1. Some bacteria; yeast; fungi
2. Facultative culture (For example, some Lactobacillus; ethanol production)
3. Same as Note 2
4. This vessel is excellent for fragile cells that are easily sheared by any type of mechanical impeller
5. Plant; algae; cyanobacteria (blue-green algae)



Winpact Vessel Overview

Double Jacketed Dish Bottom Vessel, FS-V-A Series



FS-V-A01

FS-V-AS5

The double jacketed vessel is featured with uniform temperature control and specifically designed for temperature sensitive and shear-force sensitive cells. For fragile cells, pitched-blade impeller is recommended to have a greater performance.

Vessel Specification

Material	Borosilicate glass / 316L stainless steel for headplate and all fittings (H:D ratio: 2:1)				
Working volume **	500ml	1L	3L	5L	10L
Total volume Δ	1L	1.5L	3.8L	6.8L	12.5L

Ordering Information

Cat. No.	Product Description
FS-V-AS5	500ml double jacketed dish bottom vessel
FS-V-A01	1L double jacketed dish bottom vessel
FS-V-A03	3L double jacketed dish bottom vessel
FS-V-A05	5L double jacketed dish bottom vessel
FS-V-A10	10L double jacketed dish bottom vessel

Single Wall Dish Bottom Vessel, FS-V-B Series



Type B vessel with heating blanket

FS-V-B01

The single wall dish bottom vessel is equipped with an inner cooling coil for temperature control. Working with an external heating blanket, it is ideal for photo-sensitive and photo-inhibition cultivation and it provides a precise and sophisticated temperature control. Additionally, dish bottom design ensures there is no dead volume.

Vessel Specification

Material	Borosilicate glass / 316L stainless steel for headplate and all fittings (H:D ratio: 2:1)					
Working volume **	1L	3L	5L	10L	15L	20L
Total volume Δ	1.5L	3.8L	6.8L	12.5L	18.7L	23.7L

* Heating blanket is necessary for FS-V-B10, FS-V-B15 and FS-V-B20.

Ordering Information

Cat. No.	Product Description
FS-V-B01	1L single wall dish bottom vessel
FS-V-B03	3L single wall dish bottom vessel
FS-V-B05	5L single wall dish bottom vessel
FS-V-B10	10L single wall dish bottom vessel
FS-V-B15	15L single wall dish bottom vessel
FS-V-B20	20L single wall dish bottom vessel

Heating Blanket (External Heating Device) Ordering Information

Cat. No.	Product Description
FS-H101-110/220	Heating Blanket for 1L Single Wall Dish Bottom Vessel
FS-H103-110/220	Heating Blanket for 3L Single Wall Dish Bottom Vessel
FS-H105-110/220	Heating Blanket for 5L Single Wall Dish Bottom Vessel
FS-H110-110/220	Heating Blanket for 10L Single Wall Dish Bottom Vessel
FS-H115-110/220	Heating Blanket for 15L Single Wall Dish Bottom Vessel
FS-H120-110/220	Heating Blanket for 20L Single Wall Dish Bottom Vessel



Air Lifter Vessel, FS-V-C Series



FS-V-C053

FS-V-C054

The air lifter system is featured with unique agitator-free design and designed for cell lines that requires air mixing functions to help cells circulate within the vessel without breaking the morphology. Micro-sparger and inner adjustable draft tube are equipped to facilitate water circulation and achieve high aeration efficiencies.

One of the key features of air lifter system is with a lighting module it becomes a photobioreactor to perform photosynthesis reactions for plant cells. Single wall (without temperature control) and double jacketed vessel (with temperature control) are available upon request.



Refer to page 27 for photobioreactor lighting module

Vessel Specification

Material	Borosilicate glass / 316L stainless steel for headplate and all fittings (H:D ratio: 3:1)	
Working volume **	5L single wall	5L double jacketed
Total volume Δ	7L	

Ordering Information

Cat. No.	Product Description
FS-V-C053	5L single wall airlifter vessel
FS-V-C054	5L double jacketed air lifter vessel

Single Wall with Single Wall Plain Bottom Vessel and Heating Base Unit, FS-V-D Series



FS-V-D05

The single wall plain bottom vessel is an ideal instrument for your routine culture. Durable stainless steel supporting rods and bottom plate are designed to withstand heavy usage. With an external heating base, it allows you to have a better heating efficiency and it is able to control the temperature up to 90 °C. FS-V-D series is especially suitable for dominated strains of microbes.

Vessel Specification

Material	Borosilicate glass / 316L stainless steel for headplate and all fittings (H:D ratio: 2:1)		
Working volume **	3L	5L	10L
Total volume Δ	3.7L	6.7L	13.1L

Ordering Information

Cat. No.	Product Description
FS-V-D03	3L single wall plain bottom vessel and heating base unit
FS-V-D05	5L single wall plain bottom vessel and heating base unit
FS-V-D10	10L single wall plain bottom vessel and heating base unit

** Suggested Max.

Δ Total volumes are approximate and may vary slightly.



Winpact Solid State Fermentation System, FS-V-SA05P

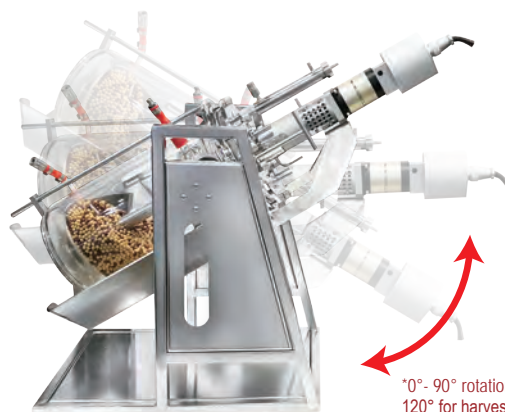


Solid state, 5L
(FS-V-SA05P)

Solid state fermentation (SSF) can be used for enzyme, antibiotics, biofuel, and organic acid production in the food, pharmaceutical, cosmetic, industries, etc. One of the features for Solid state fermentation is to create low water level cultivating conditions for fungus, mold, filamentous fungi, and some bacteria growth.

Winpact Solid State Fermentation system is designed for the laboratory scale research to get excellent results. It is featured with a 10.4" color touch screen, user-friendly interface and 4 built-in peristaltic pumps on the Linux based operation system. An automatic vessel angle control mechanism provides an outstanding mixing efficiency for solid state material research.

This system is suitable for both aerobic and anaerobic fermentation with three kinds of impellers available (Broken, Anchor and Spiral type).



*0°- 90° rotation,
120° for harvest

Features

- Fully integrated system specifically designed for solid-state fermentation research involving saccharification, hydrolysis and more.
- Programmable angle-adjustable (0-90° for culture control, 120° for harvest control) vessel tilting and stirring mechanism permits superior sample homogeneity
- Impellers are designed to reduce stickiness and it ensures sample integrity during the fermentation process.
- Integrated motor shaft & air sparger assembly creates precise, disturbance-free controls of aeration and mixing
- Chemically resistant double jacketed borosilicate glass vessel design
- Can be used with pH and DO probes to control culture conditions (anchor type impellers only)
- Customizable impellers and aeration controller available
- Winpact Humidifier is available for real-time monitoring and humidity adjustment.

**The minimum speed varies from 1-5 rpm depending on the medium viscosity.



Winpact Humidifier
(FS-O-HMD)

Impeller Type:



Broken



Anchor



Spiral

Control Unit	Control Panel	10.4" color touch-screen Interface, (Resolution: 800 x 600 pixels)
	Communication Port	Remote control through Ethernet, Analog AUX port for system extension
	Storage Program	Up to 59,994 programs for different kinds of condition.
	Data Internal Storage	Up to 100 data files.
	Data External Storage Interface	USB port
	Cabinet Material	Front panel: ABS / Housing: Painted iron
	Rated Voltage	110V~/ 220V~ ; 50/60 Hz
Aeration	Inlet Gas Flow-meter	0, 1 – 10 LPM
Dimension	Overall Diameter 350mm; Overall Height with Condenser 683 mm; Overall Height without Condenser 448 mm Dimension (with vessel holder) 430mm (L) x 730mm (W) x 780 mm (H)	
Temperature	Heating	Thermostat system: Built-in heat exchanger, 550W heater/water circulation pump
	Cooling	Automatic cooling water valve
	Range	5°C (41°F) above coolant up to 60°C (140°F)
	Resolution	0.1°C
	Control Mode	Manual or programmable 15-step PID control.
Agitation	Drive	Removable top brushless motor
	Speed Range	0, 1 – 60 rpm
	Resolution	1rpm
	Control Mode	Manual or programmable 15-step PID control.
	Impeller	1. Broken type (FS-A-IM305) 2. Anchor type (FS-A-IM408) 3. Spiral type (FS-A-IM507) (Select one from the above type, and only anchor impeller can be used with pH and DO probes) *Note: Customized impellers are available. **In pH and DO measurement condition, the minimum medium volume is 4L and water content is more than 50%, tilting angle not over 30 degree. ***The measure value of pH and DO may not accurate when using in solid-state culture condition. ****pH and DO probe is not within the scope of warranty when using in solid-state vessel.
Vessel Swing	Angle Range	Normal operation: 0°~90°, adjustable time interval Harvest mode: 0°/ 120°
	Control Mode	Programmable control



Gas Mixing Station with Mass Flow Controller

Automatic Mass flow controlled Gas Mixing Station is designed to have more precise gassing control and quicker response. Supplying up to four gases allows you to optimize a variety of cell and microorganism applications. Automatic oxygen and nitrogen control is able to remain the desired dissolved oxygen (DO) level and create anaerobic environments easily. Moreover, carbon dioxide supply provides you an option to control the pH of culture conditions without liquid acid addition.

Features

- Automatic control with quick response and precise flow rate control
- Perfect for cell and microorganism cultivation Individual gas control
- Blend air, oxygen, carbon dioxide and nitrogen in any proportion to optimize cell growth
- Adjust pH using carbon dioxide; avoid media dilution by addition of liquid acid
- Control DO by addition of oxygen gas and nitrogen gas
- Integrated with DO cascade for precise DO control

Gas Mixing Station

Winpact Gas Mixing Station enables you to supply up to four gases and control microorganism cultivation with ease by adjusting four manual flow meters individually. Dissolved oxygen (DO) level and pH value can be controlled by adjusting the gas composition supplied to the system. Four solenoid valves open and close automatically in response to the change of culture environments.

Features

- Perfect for microorganism cultivation Individual gas control
- Blend air, oxygen, carbon dioxide and nitrogen in any proportion to optimize microorganism growth
- Adjust pH using carbon dioxide; avoid media dilution by addition of liquid acid
- Control DO by addition of oxygen gas and nitrogen gas
- Integrated with DO cascade



Ordering Information

Cat. No.	Product Description
FS-O-GM-MFC	Gas mixing station with four mass flow controllers for Air, O ₂ , N ₂ and CO ₂ , The standard flow rate : Air is 2vvm, O ₂ is 1vvm, N ₂ is 0.5vvm, CO ₂ is 0.5vvm. Customizing gas flow rate is available, please contact and discuss with local dealer before order.

*vvm : gas volume flow per unit of liquid volume per minute

Specification

Control gases	Air, N ₂ , O ₂ and CO ₂						
Control parameter	DO and pH						
Components	4 Solenoid valves, 4 pressure gauges and 4 rotameters						
DO cascade	One-way (O ₂) or bi-directional (O ₂ & N ₂) DO control						
Vessel size		1 L	3 L	5 L	10 L	15L	20L
Microbial(lpm) (standard spec)	Air	2	6	10	20	30	40
	O ₂	1	3	5	10	15	20
	N ₂	0.5	1.5	2.5	5	7.5	10
	CO ₂	0.5	1.5	2.5	5	7.5	10
Cell culture(lpm) (standard spec)	Air	0.2	0.6	1	2	3	4
	O ₂	0.1	0.3	0.5	1	1.5	2
	N ₂	0.1	0.3	0.5	1	1.5	2
	CO ₂	0.1	0.3	0.5	1	1.5	2
Control mode	Manual or automatic						
Indicator	LED indicator						
Air connection	1/4" (6.35 mm) fitting for gas inlet/outlet						

* Customizing gas flow rate is available upon request.

Ordering Information

Cat. No.	Product Description
FS-O-GM	Gas Mixing Station



Oxygen Enrichment Module with Mass Flow Controller

The mass flow controller is an oxygen supplementation device for your Winpact system. It is capable of accurately adjust the flow rate of the external oxygen to control the DO level within the vessel under DO cascade mode. It features great resistance to fluctuations in gas flow which ensures precise control and repeatability for your experimental conditions.

Features

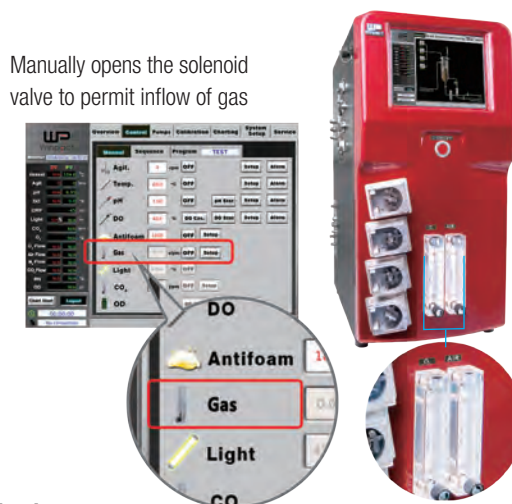
- Resistant to flow variability from gas pressure changes
- Automatic control of flow rate to gas input
- Precise control of gas flow rate
- Automatic control and DO Cascade
- Hassle-free: comes built-in to the controller

Gas Inlet Control Module

This Gas inlet control module is an optional device for your fermentation process. It enables the Winpact system to support your culture with addition of gas. The inlet control module consists of a gas pressure gauge, solenoid valve, and a rotameter. These components allow the external connection of gas to flow into the Winpact controller to be regulated either manually or automatically.

Features

- Maintain aerobic environment for fermentation process
- Designed for high cell density and cells with high oxygen requirements
- Precise control of DO level
- Controlled manually or via DO control loop
- Manually flow rate adjustment via flow meter; flow rate duration via solenoid valve



Specification

Components	Includes a manual rotameter and a mass flow controller	
Function	(1) Automatic oxygen flow rate adjustment (via Mass flow controller) (2) DO cascade control: response to DO change	
Rotameter range	1 L, 3 L, 5 L	0 – 5 LPM
	10 L	0 – 10 LPM
	15 L, 20 L	0 - 20 LPM

Specification

Components	Includes a manual rotameter and a pulsed control valve	
Function	(1) Manual oxygen flow rate adjustment (via rotameter) (2) DO cascade control: response to DO change	
Rotameter range	1 L, 3 L, 5 L	0, 0.4 – 5 LPM
	10 L	0, 1 – 10 LPM
	15 L, 20 L	0, 2 – 20 LPM

Ordering Information

Cat. No.	Product Description
FS-O-MF01	Oxygen Enrichment with Mass Flow Controller for FS-05 Parallel Fermentation System, single module for one side
FS-O-MF02	Oxygen Enrichment with Mass Flow Controller for FS-05 Parallel Fermentation System, dual modules for two sides
FS-O-MF03	Oxygen Enrichment with Mass Flow Controller for FS-07 Evo Fermentation System

*O₂ flow rate is 1vvm.

Ordering Information

Cat. No.	Product Description
FS-0-0E01	Gas Inlet Control Module, including Solenoid Valve and Adjustable Rotameter for Parallel Fermentation System, single module
FS-0-0E02	Gas Inlet Control Module, including Solenoid Valve and Adjustable Rotameter for Parallel Fermentation System, dual module
FS-0-0E03	Gas Inlet Control Module, including Solenoid Valve and Adjustable Rotameter for Winpact One Fermentation System
FS-0-0E04	Gas Inlet Control Module, including Solenoid Valve and Adjustable Rotameter for Winpact Evo Fermentation System

when purchasing Gas Inlet Control Module with CO₂/O₂ off gas analyzer, CO₂ could be regulated and controlled
*note: for CO₂ gases control purposes, it requires the installation of Gas Analyzer (FS-O-GA)

Winpack Mass Flow Controller

Compare to the external mass flow module which requires connecting to the Fermentation System, Winpack's newly-developed MassFlow is now built in the FS controller itself. With smaller size, light weight and affordable price, Winpack Mass Flow will be the mass flow controller of next generation.

Features

- Affordable price
- Self-made, high quality guarantee

CO₂/O₂ Off-gas Analyzer

The Winpack CO₂ /O₂ off-gas analyzer provides real-time measurement of carbon dioxide and oxygen concentration of the bioreactor exhaust gas. The CO₂ concentration is determined using a self-calibrating non-dispersion infrared sensor, while an electrochemical sensor monitors the oxygen concentration. Using this information, the user can continuously monitor metabolism and analyze cell growth parameters.

Features

- Instant monitoring of bioreactor metabolic activity
- Directly connected to controller for real-time monitoring, recording, and data export to PC
- Sturdy, compact housing fits directly on top of Winpack control unit
- Long-life, durable, O₂ and CO₂ sensors
- Integrated soda lime column for self-calibration of CO₂ detector
- External copper sulfate column absorbs moisture from inlet gas, ensuring accurate gas measurement



Ordering Information

Cat. No.	Product Description
FS-O-MF12	Air Mass Flow Controller for FS-05 Parallel Fermentation System, single module for one side
FS-O-MF13	Air Mass Flow Controller for FS-05 Parallel Fermentation System, dual modules for two side
FS-O-MF14	Air Mass Flow Controller for FS-07 Evo Fermentation System

*Air flow rate is 2vvm.

Specification

Control gases	Carbon Dioxide	Oxygen
Range	0-10% (selectable range available)	0 – 50%
Detector type	Non-dispersion Infrared (NDIR)	Electrochemical
Accuracy	±5%	±1% (full scale)
Response time	1.6 seconds	14±2 seconds
Operating humidity	10-90% RH	
Calibration	Auto-zero; default value present in factory (Built-in initialization)	Air or calibration gas
Sample delivery	Inboard sample pump	
Sample connection	1/4" (6 mm) fittings for gas inlet/outlet ports	
Sample flow rate	300 - 1000 ml/min	
Flow meter range	100 - 1000 ml/min	
Power requirement	110 – 230 V AC, 50/60Hz	
Fuse rating	2 Amp	
Dimension	(W x L x H) 355 x 230 x 190 mm	

*CO₂ measurement range needs to be clarified when ordering.

Ordering Information

Cat. No.	Product Description
FS-O-GA	CO ₂ /O ₂ Off-Gas Analyzer



Winpact Humidifier

Winpact Humidifier is specially designed for solid state cultivation which not only provides real-time monitoring of the humidity but also adjusts the humidity to offer optimal culture conditions. Winpact Humidifier is directly connected to the controllers and it is able to automatically switch between normal air supply and moist air supply based on the desired set value and the present humidity with the software integration.



Specification

Measurement Range	20~80%RH at 25°C
Accuracy	+/- 7%RH (20~80%RH at 25°C)
Control Mode	Automatic
Power Requirement	From Winpact fermentation controller
Operation Temperature	Room temperature to 40°C
Material	Black painted iron case
Tube Connection	8X5mm PU/PTFE tube
Power Indication	LED indicator
Operation Indication	LED indicator
Dimension	(W x L x H) 241.8 X 320.5 X 138.7mm

Ordering Information

Cat. No.	Product Description
FS-O-HMD	Humidity Detector for Solid State Fermentation System

Photobioreactor Lighting Module

Winpact offers the exclusive lighting module for our Winpact systems. Our special designed lighting module is suitable for running any photon-related lab experiments such as photosynthesis reaction. This lighting module is constructed with sleek stainless steel for better appearance and reflection when light shines through the vessel. Winpact software consists of 15-step program, light intensity adjustment, and self-calibration mode.

Features

- Utilize artificial light to simulate bio-photosynthesis reaction
- Adjustable light intensity manually or automatically
- Fluorescent light source
- On/off timer
- Expandable up to 3 lighting modules
- 15-step programmable lighting schedule
- Ideal for plant algae or cyanobacteria experiments

*FS-V-C054 + FS-O-PB-2



15-step programmable lighting schedule



Specification

Light intensity control range	5-100%
Light module	3 Fluorescent lamps / each module
Lamp specification	T5/14W, Ø16 mm x L549 mm
Light color temperature	6500 K
Luminous flux per lamp	1150 lm
Sensor type	Light intensity sensor, photodiode
Light intensity	Max. 10000 lux
Control mode	On/off and timed control
Expandable modules	Up to 3 sets of the lighting modules
Dimension	(W x L x H) 200 x 326 x 648 mm
Weight	Approx. 7 Kg / each module
Rated voltage	110/220V~(selectable), 50/60Hz, 5A

Ordering Information

Cat. No.	Product Description
FS-O-PB-1	1 Photo-Bioreactor Lighting Module
FS-O-PB-2	2 Photo-Bioreactor Lighting Modules
FS-O-PB-3	3 Photo-Bioreactor Lighting Modules

*For best result, a minimum of 2 units of photo-Bioreactor lighting module is required.

pH Probe

This state-of-the-art, gel-filled low maintenance pH-electrode with excellent pressure resistance is specifically developed for reliable measurements in bioprocess. With pressure resistance to 6 bar and silver-ion trap to prevent fouling of diaphragm in sulfide-bearing media, the glass body pH electrode can be used on an universal basis in bioprocess applications.

Features

- Fast response
- Proven reliability
- High resolution and precision
- Suitable for autoclave, SIP and CIP
- User-calibration available



FS-A-PPH01-MT

FS-A-PPH01-HM

FS-A-PPH05-MT

Specification

pH range	0 -14 (2-12 for maximum precision)
Temperature	0-135°C (275°F)
Resolution of pH	0.01
Pressure	6 bar maximum
Shaft diameter	12 mm
Connection	Pg 13.5
Temperature compensation	Integral PT-100 (VP model)

Ordering Information

Cat. No.	Product Description
FS-A-PPH00-MT	pH Electrode Cable, AK9 Type, Mettler Toledo
FS-A-PPH01-MT	120 mm pH Probe for 0.5 L, 1 L vessel, Mettler Toledo
FS-A-PPH02-MT	225 mm pH Probe for 3 L vessel, Mettler Toledo
FS-A-PPH03-MT	325 mm pH Probe for 5-15 L vessel, Mettler Toledo
FS-A-PPH04-MT	425 mm pH Probe for 20 L vessel, Mettler Toledo
FS-A-PPH05-MT	325mm pH probe with protective case and cable, for 5L solid state vessel only, Mettler Toledo

FS-A-PPH00-HM	pH Electrode Cable, AK9 Type, Hamilton
FS-A-PPH01-HM	120 mm pH Probe for 0.5 L, 1 L vessel, Hamilton
FS-A-PPH02-HM	225 mm pH Probe for 3 L vessel, Hamilton
FS-A-PPH03-HM	325 mm pH Probe for 5-15 L vessel, Hamilton
FS-A-PPH04-HM	425 mm pH Probe for 20 L vessel, Hamilton



DO Probe

This stainless steel constructed dissolved oxygen sensor is designed for maximum accuracy and reliability. Modular and robust design along with state-of-the-art interior sensor design allows for easy disassembly for maintenance. PTFE/silicone membrane designed with an internal steel mesh makes the membrane more rugged, drastically improving repeatability of these sensors in bioprocess applications.

Features

- Fast response
- Proven reliability
- High resolution and precision
- Suitable for autoclave, SIP and CIP
- User-calibration available

Oxidation Reduction Potential (ORP) Probe

This ORP probe is an optional accessory for the Winpact fermentation system. It measures the oxidation-reduction potential of the fermented media, which could be an indicator for the anaerobic conditions/reactions. This low-maintenance and sterilizable probe is designed to withstand repeated autoclave cycles without any decline in the measuring accuracy.

Features

- Designed to use for Winpact fermentation system
- Low maintenance
- Fully autoclavable sensor
- Long operation lifetime



FS-A-PD001-MT

FS-A-PD001-HM



Specification

DO sensor type	Polarographic
Dissolved oxygen	0.1 - 100% air saturation 10 ppb to saturation
Temperature	0 - 135°C (275°F)
Resolution	0.1%
Pressure	4 bar maximum
Temperature compensation	22 kohm thermistor
Wetted material	316L stainless steel
Shaft diameter	12 mm
Surface finish	Ra 12 (electro-polished)

Ordering Information

Cat. No.	Product Description
FS-A-PD000-MT	DO Probe Cable VP Type, Mettler Toledo
FS-A-PD001-MT	120 mm DO Probe for 0.5 L, 1 L vessel, Mettler Toledo
FS-A-PD002-MT	220 mm DO Probe for 3 L vessel, Mettler Toledo
FS-A-PD003-MT	320 mm DO Probe for 5-15 L vessel, Mettler Toledo
FS-A-PD004-MT	420 mm DO Probe for 20 L vessel, Mettler Toledo

FS-A-PD000-HM	DO Probe Cable VP Type, Hamilton
FS-A-PD001-HM	120 mm DO Probe for 0.5 L, 1 L vessel, Hamilton
FS-A-PD002-HM	225 mm DO Probe for 3 L vessel, Hamilton
FS-A-PD003-HM	325 mm DO Probe for 5-15 L vessel, Hamilton
FS-A-PD004-HM	425 mm DO Probe for 20 L vessel, Hamilton

Specification

Electrode	Gel-filled, Low-maintenance redox electrode
Scale	-2000~2000 mV
Temperature range	0 - 130°C (32 - 266 °F)
Autoclavable	Yes

Ordering Information

Cat. No.	Product Description
FS-A-PORP00	ORP Probe Cable
FS-A-PORP01	120 mm ORP Probe for 0.5 L, 1 L vessel
FS-A-PORP02	225 mm ORP Probe for 3 L vessel
FS-A-PORP03	325 mm ORP Probe for 5 L-15 L vessel and above
FS-A-PORP04	425 mm ORP Probe for 20 L vessel

ORP Monitoring Kit

FS-0-ORP-101	ORP Monitoring Kit, includes 120 mm ORP Probe, ORP Probe Cable, and Probe Adaptor
FS-0-ORP-102	ORP Monitoring Kit, includes 225 mm ORP Probe, ORP Probe Cable, and Probe Adaptor
FS-0-ORP-103	ORP Monitoring Kit, includes 325 mm ORP Probe, ORP Probe Cable, and Probe Adaptor
FS-0-ORP-104	ORP Monitoring Kit, includes 425 mm ORP Probe, ORP Probe Cable, and Probe Adaptor

Temperature Probe

This temperature probe is placed inside of a stainless steel tube in the head plate to measure the vessel temperature while maintaining sterility. With high accuracy and proven reliability, it is applicable to all of our fermentation systems in all kinds of fermentation conditions.

Features

- High accurate PT100 sensor - platinum resistance thermometers (PRTs)
- Customized length- we offer the most suitable probe lengths for different vessel size
- Proven reliability
- Non-autoclavable

Antifoam Probe

This antifoam probe is height-adjustable with proven reliability. It can be equipped with our controllers for the vessels. Once foaming is detected within the vessel, the controller unit will respond by pumping defoamer solution to disperse the foam and ensure the experiment progresses properly. This will ensure your experiment runs smoothly without worrying about the foam formation.

Features

- Adjustable height
- Made with stainless steel tips and PTFE coating
- Proven reliability
- Suitable for autoclave, SIP, CIP



Specification

Housing materials	316L stainless steel
Accuracy	± 0.2°C
Resolution	0.1°C

Ordering Information

Cat. No.	Product Description
FS-A-PPT00	Temperature Probe Cable
FS-A-PPT01	150 mm Temperature Probe for 0.5 L vessel
FS-A-PPT02	250 mm Temperature Probe for 1 L, 3 L vessel
FS-A-PPT03	350 mm Temperature Probe for 5 L vessel
FS-A-PPT04	400 mm Temperature Probe for 10-15 L vessel
FS-A-PPT05	550 mm Temperature Probe for 20 L vessel



Specification

Housing materials	Stainless steel tips and PTFE body
Sensitivity	Adjustable via controlling software

Ordering Information

Cat. No.	Product Description
FS-A-PLV00	Foam/Level Sensor Cable
FS-A-PLV02	Foam/Level Sensor with PTFE black coating



Sampling Device

Our simple and intuitive sampling devices allow you to aseptically take out your sample for cell density measurement.

The tri-port design ensures your sample is sterile and contamination-free when sampling. For stainless steel ball valve and sanitary valve sampling device, please contact your regional managers for detail information.

Features

- Easy and simple sampling device
- Ensure sterility during sampling

Specification

Tube capacity	15 ml
Construction material	316L stainless steel

Ordering Information

Cat. No.	Product Description
FS-ACC-001	Triport Sampling Device, 15 ml
FS-ACC-002	Dual Port Sampling Device, 15 ml

Stainless steel ball valve sampling device

FS-ACC-011	For FS-V-B01, FS-V-A01, FS-V-AS5
FS-ACC-012	For FS-V-A03, FS-V-B03, FS-V-D03
FS-ACC-013	For FS-V-D05, FS-V-A05, FS-V-B05
FS-ACC-015	For FS-V-B10, FS-V-A10
FS-ACC-016	For FS-V-D10
FS-ACC-017	For FS-V-B15, FS-V-C053, FS-V-C054
FS-ACC-019	For FS-V-B20

Stainless steel sanitary valve sampling device

FS-ACC-021	For FS-V-B01, FS-V-A01, FS-V-AS5
FS-ACC-022	For FS-V-A03, FS-V-B03, FS-V-D03
FS-ACC-023	For FS-V-D05, FS-V-A05, FS-V-B05
FS-ACC-025	For FS-V-B10, FS-V-A10
FS-ACC-026	For FS-V-D10
FS-ACC-027	For FS-V-B15, FS-V-C053, FS-V-C054
FS-ACC-029	For FS-V-B20

Stainless steel pneumatic sampling device

FS-ACC-031	For FS-V-B01, FS-V-A01
FS-ACC-032	For FS-V-A03, FS-V-B03, FS-V-D03
FS-ACC-033	For FS-V-D05, FS-V-A05, FS-V-B05
FS-ACC-035	For FS-V-B10, FS-V-A10
FS-ACC-036	For FS-V-D10
FS-ACC-037	For FS-V-B15, FS-V-C053, FS-V-C054
FS-ACC-039	For FS-V-B20

Stainless steel Solid Sampler

CM-FS-O-SS	For FS-V-SA05
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Stainless steel ball valve sampling device



External Pump

Our digital control peristaltic pump fits perfectly with our Winpack series. This easy-to-use pump design allows different silicone tubing sizes to be fitted. With the capability of reverse your flow direction, it provides convenience and flexibility to the operators.

Features

- Microprocessor controller
- Compact size
- Easy load pump head
- Wide applications
- Reversible for purging
- Capable of 2 pump heads installation (except MU-D03)

Specifications

Cat. No	MU-D01	MU-D02	MU-D03
Controller	Digital microprocessor controller		
Motor	Brushless motor		
Power	50W		100W
Pump Speed / Increment	20 - 300rpm / 1rpm	5 - 600rpm / 1rpm	20 - 300rpm / 1rpm
Flow Range **	1.2 - 1,140ml/min	0.3 - 2,280ml/min	8 - 3,272ml/min
Number Of Rollers	4		2
Operating Temperature	Ambient to 40 °C		
Dimension (WxLxH)	Approx. 7.9"x13.4"x5.1" (200x340x130mm)		Approx. 9.5"x13.3"x 6.6" (240x338x167mm)
Material	Painted iron metal		
Weight	Approx. 12.5lb (5.7kg)		Approx. 13.4lb (6.2kg)
Rated Voltage	110V/220V~	100V-240V~	100V-240V~
Program	2-step Program (running & ceasing); Max. of timer: 99 (hr) : 59 (min) : 59 (sec)		
Auto Resume Function	Yes		

**The flow range is subject to the silicone tube that used. Please see Silicon tubing specifications table for reference.

Ordering Information

Cat. No.	Product Description
MU-D01	Digital Peristaltic Pump, 110V / 220V
MU-D02	Superior Digital Peristaltic Pump, 100 - 240V
MU-D03	Supreme Digital Peristaltic Pump, 100 - 240V
PWI-FS-05-00000000	Digital Peristaltic Pump Connection Cable for FS-05
PWI-FS-06-00000000	Digital Peristaltic Pump Connection Cable for FS-06, FS-07

Accessories

Cat. No.	Product Description
MU-S13	Silicone Tube I.D. 1/32" (0.8 mm), 25 ft (7.6 m)
MU-S14	Silicone Tube I.D. 1/16" (1.6 mm), 25 ft (7.6 m)
MU-S16	Silicone Tube I.D. 1/8" (3.1 mm), 25 ft (7.6 m)
MU-S25	Silicone Tube I.D. 3/16" (4.8 mm), 25 ft (7.6 m)

Tubing Information(wall thickness is 1.6mm)

Silicon Tubing Specifications				
Cat. No.	MU-S13	MU-S14	MU-S16	MU-S25
Inner Diameter Inches. (mm)	0.03(0.8)	0.06(1.6)	0.12(3.1)	0.19(4.8)
Hose Barb Size Inches. (mm)	1/16(1.6)	1/16(1.6)	1/8(3.2)	3/16(4.8)
Flow Range With 6 To 600rpm Drive (ml/min)	0.36 to 36	1.3 to 130	4.8 to 480	10 to 1000
	*The flow range is subject to the motor drive of the pump. Please see Peristaltic Pump specifications for reference.			
Maximum Pressure, Continuous	25psig (1.7bar)		20psig (1.4bar)	
Maximum Pressure, Intermittent	40psig (2.7bar)		35psig (2.4bar)	
Maximum Vacuum	26" Hg (660mm Hg)			
Suction Lift	29ft H ₂ O (8.8m H ₂ O)			



MU-D01 / MU-D02



MU-D03



Brushless Agitation Motor

Our special designed brushless agitation motor fits on all of our systems to avoid emission of carbon particles. The lower voltage design also provides a higher safety level to the operator.

Features

- Low noise
- Low vibration
- Controlled torque
- Smooth operation
- Long life
- Minimal maintenance



FS-M2

FS-M3

FS-M4

Specification

Motor type	24V DC brushless motor
Connection with vessel	Quick connector, no tools required

Ordering Information

Cat. No.	Product Description
FS-M2	Agitation Motor 30 -1200 rpm for 3-5 L vessel; 30 -1000 rpm for 10 L vessel; 30 - 700 rpm for 15, 20 L vessel
FS-M3	Agitation Motor 30-1800rpm for 0.5 L, 1 L vessel
FS-M4	Agitation Motor 60rpm for 5 L solid state vessel

Stainless Steel Condenser

Winpact offers flexibility in our condenser to help you maintain the best performance for your experiment.

All of our fermentation condensers are constructed from SUS316L stainless steel with quick connector installment. The quick connector brings you quick and convenience during system installation. The new designed 360° condenser (FS-A-CON04) for Air Lifter vessel allows you to dramatically reduce the height to fit in the conventional autoclave. Condenser is included in the vessel package.

Features

- Stainless steel construction
- Quick connector assembled for easy operation
- Compatible with all types of Winpact vessels



FS-A-CON01

Specification

Cat. No.	FS-A-CON01	FS-A-CON02
Suitable vessel size	3 L vessel only	5 - 10 L vessel
Material	316L stainless steel	
Height	257.6 mm	210.6 mm
O.D. for outlet	6.35 mm	

Cat. No.	FS-A-CON03	FS-A-CON04
Suitable vessel size	15 - 20 L vessel	Air lifter vessel
Material	316L stainless steel	
Height	214.1 mm	281.76 mm (1) 96 mm (2)
O.D. for outlet	12.7 mm	6.35 mm

Cat. No.	FS-A-CON05
Suitable vessel size	0.5 - 1 L vessel
Material	316L stainless steel
Height	200 mm
O.D. for outlet	6.35 mm

Ordering Information

Cat. No.	Product Description
FS-A-CON01	Stainless Steel Condenser, 3 L vessel only
FS-A-CON02	Stainless Steel Condenser, 5 - 10 L vessel
FS-A-CON03	Stainless Steel Condenser, 15 - 20 L vessel
FS-A-CON04	Stainless Steel Condenser, Air lifter vessel
FS-A-CON05	Stainless Steel Condenser, 0.5 - 1 L vessel only

Condenser customization is available upon request.

Impeller

Two standard agitation impellers are available for your selection. Whereas Rushton impeller offers high shearing force and pitched blade offers moderate shearing force for your sensitive and fragile experiment. Foam-breaking impeller help you maintain foam free environment.

Features

- 316 stainless steel construction
- Height adjustable
- Angle adjustable (pitched blade only)
- Customization available



Specification

Construction materials	316L stainless steel
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Ordering Information

Cat. No.	Product Description
FS-A-IM101	Rushton 4-Blade Impeller, suitable for 0.5 L, 1 L Vessel, 2/pk
FS-A-IM103	Rushton 6-Blade Impeller, suitable for 3 L Vessel, 3/pk
FS-A-IM105	Rushton 6-Blade Impeller, suitable for 5 L Vessel, 3/pk
FS-A-IM110	Rushton 6-Blade Impeller, suitable for 10 L Vessel, 3/pk
FS-A-IM120	Rushton 6-Blade Impeller, for 15 L or 20 L Vessel, 3/pk
FS-A-IM201	Pitched Blade Impeller, suitable for 0.5 L, 1 L Vessel, 2/pk
FS-A-IM203	Pitched Blade Impeller, suitable for 3 L Vessel, 3/pk
FS-A-IM205	Pitched Blade Impeller, suitable for 5 L Vessel, 3/pk
FS-A-IM210	Pitched Blade Impeller, suitable for 10 L Vessel, 3/pk
FS-A-IM215	Pitched Blade Impeller, suitable for 15 L Vessel, 3/pk
FS-A-IM220	Pitched Blade Impeller, suitable for 20 L Vessel, 3/pk
FS-O-DB-01	Foam Breaker Impeller, 95 mm, suitable for FS-V-A10 and FS-V-B10 and FS-V-D05
FS-O-DB-02	Foam Breaker Impeller, 110 mm, suitable for FS-V-B15 and FS-V-B20
FS-O-DB-03	Foam Breaker Impeller, 130 mm, suitable for FS-V-D10 only



Motor Shaft Protection Cap

Motor Shaft Protection Cap is designed for the motor shaft of Winpact vessels. The cap can be used when the fermentor is not in use or during sterilization. Major Science provides a convenient and simple way to protect the motor shaft from any possible damage caused by environment.

Features

- Stainless steel construction
- Suitable for all vessel types
- Protect the motor shaft when the fermentor is not in use or during sterilization

Headplate Stand

Our customized headplate stand provides a suitable and stable home for your headplate whenever the headplate is dispatched from the glass vessel. It could also eliminate the possibility of the damages caused by random misplacement of the headplate.

Features

- Stable configuration
- Easy to use
- Stainless steel construction
- Light weight



FS-A-MCAP

Specification

Cat. No.	FS-A-MCAP
Cap dimension	125 x 47.5 mm (W x H)
Pull-Ring dimension	25.4 x 10 mm (W x H)
Material	304 stainless steel

Ordering Information

Cat. No.	Product Description
FS-A-MCAP	Stainless Steel Protected Cap



FS-A-HS03

Specification

Cat. No.	Dimension	Material
FS-A-HS01	Total: 170 x 170 x 213 mm Headplate holder: Ø170 x 2T Bottom plate: 170 x 170 x 3T Pole: Ø10 x L200 (mm)	304 stainless steel
FS-A-HS02	Total: 230 x 230 x 363 mm Headplate holder: Ø230 x 2T Bottom plate: 230 x 230 x 3T Pole: Ø10 x L350 (mm)	
FS-A-HS03	Total: 260 x 260 x 463 mm Headplate holder: Ø260 x 2T Bottom plate: 260 x 260 x 3T Pole: Ø10 x L450 (mm)	
FS-A-HS04	Total: 260 x 260 x 613 mm Headplate holder: Ø300 x 2T Bottom plate: 300 x 300 x 3T Pole: Ø10 x L600 (mm)	
FS-A-HS05	Total: 260 x 260 x 513 mm Headplate holder: Ø210 x 2T Bottom plate: 210 x 210 x 3T Pole: Ø10 x L500 (mm)	

Ordering Information

Cat. No.	Product Description
FS-A-HS01	Headplate Stand for 1 L vessel
FS-A-HS02	Headplate Stand for 3-5 L vessel
FS-A-HS03	Headplate Stand for 10 L vessel
FS-A-HS04	Headplate Stand for 15-20 L vessel
FS-A-HS05	Headplate Stand for Air Lifter (FS-V-C series) vessel

Fermentation Bottle Holder

This simple stainless steel constructed feeding bottle holder fits perfectly with our glass vessel. Assembly is free from any tools and easy installation. Each bottle holder can hold up to 2 x 250ml bottles and perform easy organization with your tubing and feeding materials.

Features

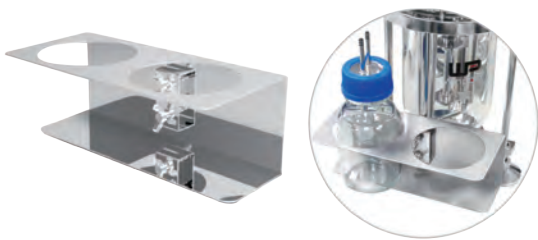
- Easy installation
- Light weight
- Capable of loading two Ø70 bottles

Stainless Steel Supporting Foot

The stainless steel supporting foot is designed to provide a more steady position for your vessel. This stainless steel foot is suitable for all vessel types and is easy to install.

Features

- Stainless steel construction
- Suitable for all vessel types
- No additional tools required for installation
- Autoclavable



Specification

Cat. No.	FS-O-BH01
Dimension	190 x 90 x 70 mm (W x L x H)
Compatible bottle size	2 bottles / Ø70 / 250 ml
Weight	0.38 kg
Materials	316L stainless steel

Specification

Cat. No.	PFSV-D54-000-R01
Dimension	Ø50 X L25 (mm)
Materials	316L stainless steel

Ordering Information

Cat. No.	Product Description
FS-O-BH01	Fermentation Bottle Holder

Ordering Information

Cat. No.	Product Description
PFSV-D54-000-R01	Stainless Steel Supporting Foot for 0.5~10 L vessel



Composite Vessel Handles

Our stainless steel composite handle is now available as an accessory for you to choose. These handles are specially designed for ease of use when lifting or moving the vessel in facilities with horizontal autoclave or hard to reach area.

Features

- Stainless steel
- Ease of use, no extra tool needed
- Compatible with all types of Winpact vessels

Loading Port

We offer customized feeding loading port according to your need. Whether a larger/smaller diameter or extra ports, we are fully capable of customization based on the specification request. Evaluation upon request.

Features

- Stainless steel construction
- Easy assemble
- Customization available



FS-A-CH-02



FS-A-CH-01



Composite vessel handles for easy vessel lifting



Specification

Cat. No.	PFSV-A05-003-R01	
Suitable vessel size	3 - 20 L vessel	
Material	316L stainless steel	
Dimension	Ø30x L80 (mm)	
Cat. No.	PFSV-D55-000-R01	PFSV-A54-003-R01
Suitable vessel size	3 L vessel or less (excluding 1 L)	5 L vessel and above
Material	316L stainless steel	
Cat. No.	PFSV-C86-003-R01	FS-A-LP02
Suitable vessel size	1 L vessel only	3 - 15 L vessel
Material	316L stainless steel	
Dimension	Ø24 x L45 (mm)	Ø30 x L35 (mm)

Specification

Material	316L stainless steel (Vertical T-bar handling)
	304 stainless steel (Horizontal handling ear)
Dimension	55 x 80 x 114 mm (W x L x H) (FS-A-CH-01)
	65 x 80 x 115 mm (W x L x H) (FS-A-CH-02)
Loading weight	30 kg / per handle

Ordering Information

Cat. No.	Product Description
FS-A-CH-01	Composite Handle for vessel size 0.5 L, 1 L, 3 L, 5 L and 10 L (2 per set)
FS-A-CH-02	Composite Handle for vessel size 15 L and 20 L (2 per set)

Ordering Information

Cat. No.	Product Description
PFSV-A05-003-R01	Twin Loading Port for 3 L-20 L vessel
PFSV-D55-000-R01	Microbial large inoculation port, suitable for 3 L vessel only
PFSV-A54-003-R01	Microbial large inoculation port, suitable for 5 L vessel and above.
PFSV-C86-003-R01	Quad Loading Port for 1 L vessel
FS-A-LP02	Quad Loading Port for 3 L~20 L vessel

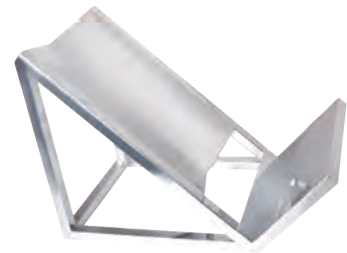
■ **Feeding Bottle Loading Port**

We offer customized feeding bottle loading port according to your need. Whether a larger/ smaller diameter or extra ports, we are fully capable of customization based on the specification upon request.



■ **Vessel Stand**

Our customized vessel stand provides a suitable and stable home due to various restrictions from the autoclave. The vessel can be set at an angle to fit the autoclave height restrictions.



Vessel Stand







Ordering Information

Cat. No.	Product Description
FS-A-SK	Winpact Evo Fermentation System Start-up Kit, for 1 vessel (3 L or more)
FS-A-SK01	250 ml Glass Feeding Bottle, Includes Two Stainless Steel Connecting Ports, Cap, and Silicone Washer
FS-A-SK02	500 ml Glass Feeding Bottle, Includes Two Stainless Steel Connecting Ports, Cap, and Silicone Washer
FS-A-SK03	50 mm, 0.2 µm Autoclavable Disc Filter, 10 /pk
FS-A-SK04	50 mm, 4.5 µm (L) Stainless Steel Connecting Tube, 15 /pk
FS-A-SK05	Handy Burner
FS-A-SK06	Silicone Tubing Clamp, 20 /pk
FS-A-SK07	2 mm Hex Wrench
FS-A-SK08	12 mm & 14 mm Double Open-end Wrench
FS-A-SK09	Crosshead(+) Screwdriver
FS-A-SK10	Two Stainless Steel Loading Ports, includes cap and silicon washer
FS-A-SK11	Winpact One Fermentation System Start-up Kit for 1 vessel (3L or more)
FS-A-SK17	Winpact Evo Fermentation System Start-up Kit for 1 vessel (1L or less)
FS-A-SK18	Winpact One Fermentation System Start-up Kit for 1 vessel (1L or less)
FS-A-SK19	Winpact Parallel Fermentation System Start-up Kit for 2 vessel (1L or less)
FS-A-SK20	Winpact Parallel Fermentation System Start-up Kit for 2 vessel (3L or more)
FS-A-SK21	Winpact Parallel Fermentation System Start-up Kit for 1 vessel (1L or less) and 1 vessel (3L or more)
FS-A-SK25	Winpact Solid state Fermentation System Start-up Kit
MU-S13	Silicone Tube, I.D. 1/32" (0.8 mm) 25 ft (7.6 m)
MU-S14	Silicone Tube, I.D. 1/16" (1.6 mm) 25 ft (7.6 m)
MU-S16	Silicone Tube, I.D. 1/8" (3.1 mm) 25 ft (7.6 m)
MU-S25	Silicone Tube, I.D. 3/16" (4.8 mm) 25 ft (7.6 m)

Consumable Kit Ordering Information

Cat. No.	Product Description
FS-A-CK-AS5	FS-V-AS5 Consumables Kit, including O-rings, Silicone Tubes, Silicone Stopper, Connector and Cap
FS-A-CK-A01-CPC	FS-V-A01 Consumables Kit (CPC), including O-rings, Silicone tubes, Silicone stopper, CPC connector and Cap
FS-A-CK-A03-CPC	FS-V-A03 Consumables Kit (CPC), including O-ring, Silicone tube, Mechanical seal, Silicone stopper, CPC Connector, Cap
FS-A-CK-A05-CPC	FS-V-A05 Consumables Kit (CPC), including O-ring, Silicone tube, Mechanical seal, Silicone stopper, CPC Connector, Cap
FS-A-CK-A10-CPC	FS-V-A10 Consumables Kit (CPC), including O-ring, Silicone tube, Mechanical seal, Silicone stopper, CPC Connector, Cap
FS-A-CK-B01-CPC	FS-V-B01 Consumables Kit (CPC), including O-rings, Silicone tubes and Silicone stopper
FS-A-CK-B03-CPC	FS-V-B03 Consumable Kit (CPC), including O-ring, Silicone tube, Mechanical seal
FS-A-CK-B05-CPC	FS-V-B05 Consumable Kit (CPC), including O-ring, Silicone stopper, Silicon tube, Mechanical seal
FS-A-CK-B10-CPC	FS-V-B10 Consumable Kit (CPC), including O-ring, Silicone stopper, Silicon tube, Mechanical seal
FS-A-CK-B15-CPC	FS-V-B15 Consumable kit (CPC), including O-ring, Silicone stopper, Silicon tube, Mechanical seal
FS-A-CK-B20-CPC	FS-V-B20 Consumable Kit (CPC), including O-ring, Silicone stopper, Silicon tube, Mechanical seal
FS-A-CK-C053-CPC	FS-V-C053 Consumable Kit (CPC), including O-ring, Silicone washers, Silicone tube, Silicone stopper, CPC Connector, Cap
FS-A-CK-C054-CPC	FS-V-C054 Consumable Kit (CPC), including O-ring, Silicone washers, Silicone tube, Silicone stopper, CPC Connector, Cap
FS-A-CK-D03-CPC	FS-V-D03 Consumable Kit (CPC), including O-ring, Silicone tube, Mechanical seal
FS-A-CK-D05-CPC	FS-V-D05 Consumable Kit (CPC), including O-ring, Silicone tube, Mechanical seal, Silicone stopper
FS-A-CK-D10-CPC	FS-V-D10 Consumable Kit (CPC), including O-ring, Silicone tube, Mechanical seal, Silicone stopper
FS-A-CK-SA05-CPC	FS-V-SA05 Consumable Kit (CPC), including O-rings, PTFE scrapers , Bearings, Mechanical seal

Tubing Order Information

Silicon Tubing Specifications				
Cat. No.	MU-S13	MU-S14	MU-S16	MU-S25
Inner Diameter Inches. (mm)	0.03(0.8)	0.06(1.6)	0.12(3.1)	0.19(4.8)
Hose Barb Size Inches. (mm)	1/16(1.6)	1/16(1.6)	1/8(3.2)	3/16(4.8)
Flow Range With 6 To 600rpm	0.36 to 36	1.3 to 130	4.8 to 480	10 to 1000
Drive (ml/min)	*The flow range is subject to the motor drive of the pump. Please see Peristaltic Pump specifications for reference.			
Maximum Pressure, Continuous	25psig (1.7bar)			20psig (1.4bar)
Maximum Pressure, Intermittent	40psig (2.7bar)			35psig (2.4bar)
Maximum Vacuum	26" Hg (660mm Hg)			
Suction Lift	29ft H ₂ O (8.8m H ₂ O)			

(Pilot Scale)

100L System



Mechanical seal with auto generated lubricant and automatic cooling device



Harvest valve
Sanitary level
diaphragm type

Detachable aseptic
feeding device



Pump



* Operating ladder is optional.



200L System

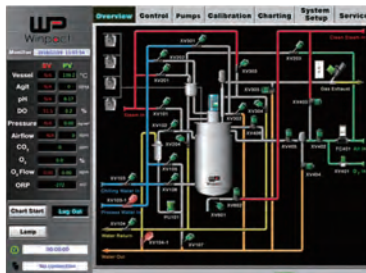
Winpact offers pilot and production scale bioreactor/fermentation systems for all of your large scale fermentation needs. Our standard SIP Production Scale Fermentation System is constructed with BPE standard piping with orbital welding and top grade automatic valves to allow stable and repeatable result for every experiment. All of our features are designed to provide a high level of productivity and automation while maintaining a low operation cost. All other great features including total sterilization process, mechanical seal break indication, golden vessel ratio design and complete selection of optional devices for optimizing the fermentation process.

Features

- Wide range of vessel selection, from 100L to 1000L working volume
- Multi-lingual 12" colored graphical control interface
- Fully automated process with remote monitoring
- 15-step automatic program setting
- Orbital welding ensures minimal residue buildup
- Highest grade construction with Stainless Steel SUS316L
- Hive jacket design provides astounding temperature control
- Exhaust pressure relief valve for maximum safety precaution
- Multiple safety design integration for peace of mind operation
- Remote monitoring & controlling software free from purchase
- Password protection for multiple users with customized access levels
- Various optional devices for process optimization and needs
- Ethernet communication with Winpact SCADA software, and IP address



- Pneumatic valves for accurate and automatic control
- Orbital welding provides top quality



Monitor page for operation overview



Automatic and manual operation



Automatic sterilization process



Online system calibration

SIP Fermentation System



30L / 50L System

* Customized vessel is available

Motor
Manual or automatic control of constant agitation speed

Peristaltic Pump
Uses four Watson Marlow built-in peristaltic pumps for all your feeding needs

Control Station
Large screen and graphical user interface

Stainless Steel Vessel
Special designed heating jacket provides better heating efficiency



FS-30L

* ASME standard



FS-50L

Features

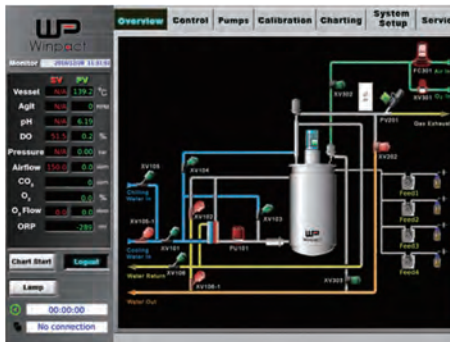
- Wide range of vessel selection, from 10L to 50L working volume
- Colorful interface at 10.4" or above
- Fully automated process with remote monitoring
- 15-step automatic program setting
- Orbital welding ensures minimal residue buildup
- Highest grade construction with 316L stainless steel
- Jacket design provides astounding temperature control
- Exhaust pressure relief valve for maximum safety precaution
- Multiple safety design integration for peace of mind operation
- Remote monitoring & controlling software free from purchase
- Password protection for multiple users with special requirements
- Various optional devices for process optimization and needs
- Ethernet communication with Winpact SCADA software, and IP address



FS-50L

Four-staged DO cascade

15-Step programmable PID control



Immediate visualization on operation overview



Easy and intuitive operation for manual and sequence control



One-Touch automatic sterilization for vessel and system tubing



Online system calibration with system feedback



System expansion with various optional devices

Specification

*For system over 100L, please contact your local distributors for more details.

Capacity	30 L	50 L	100 L	200 L
Total volume	42 L	67 L	120 L	268 L
Working volume	30 L	50 L	100 L	200 L
Dimension	130x95x275 cm	130x95x295 cm	170Wx130Dx245H cm (Open distance of headplate lift : 60 cm)	200Wx150Dx330H cm (Open distance of headplate lift : 40 cm)
Vessel and jacket maximum working pressure	3 bar (43.5 psig) / 4 bar (58 psig)		3 bar (43.5 psig) / 3 bar (43.5 psig)	
Type	Double layered fully enclosed capsule-type tank		Double layered fully enclosed capsule-type tank, with an outer temperature protective layer	
Material	Direct contact to medium - 316L stainless steel; all others - 304 stainless steel			
Surface finish	Interior polish ≤ 25 Ra/in (0.6 μ m) Mechanical polishing; Electropolish optional Exterior polish ≤ 32 Ra/in (0.8 μ m) Mechanical polishing; Electropolish optional			
Ports	Ports designed according to user requirements			
Piping and valve materials	<p>Parts that directly contact with the product/medium uses 316L stainless steel (≤ 25 Ra/in) internal polished tubing (BPE standard) :</p> <p>A.) Internal EP polished diaphragm type pneumatic valve and manual valve (BPE standard)</p> <p>B.) Tubing all welded with orbital welding</p> <p>C.) Vessel bottom drain uses a diaphragm valve, to minimize dead volume</p> <p>D.) Piping designed for ease of transfer to scale up (can be used as a seed fermentation system) or downstream process</p> <p>Parts that do not directly contact product/medium</p> <p>A.) Constructed with 304 stainless steel</p>			
Controller	10.4" color industrial touch screen	12" color industrial touch screen		
	<ul style="list-style-type: none"> * User-friendly, graphical control interface * Includes secure user accounts, with different levels of access * Modularized and standardized design (Module Skid): ergonomically designed according to height, ease of vessel clean up, and ease of extraction in relation to vessel bottom valve * Includes maintenance page with system diagnostics * All programmed setting values are automatically stored into the built-in memory; the settings will not be lost in case of power outage/interruption. When power is restored, the interrupted process will automatically resumed 			
Setting	<ul style="list-style-type: none"> * Automated sterilization process * Automated fermentation program 			
DO	<ul style="list-style-type: none"> * 0-200%, Control range:0-100%, adjustable * Software electrode calibration, with automatic temperature compensation function * Includes one set of side-inserted stainless steel autoclavable DO electrode * DO Stat features with intelligent feeding 			
pH	<ul style="list-style-type: none"> * PID control with adjustable deadband * Control range 0 to 14 (2-12 for maximum precision), resolution: 0.01 pH * Calibration function with automatic temperature compensation function * Includes one set of side-inserted, autoclavable pH probe with stainless steel housing * pH Stat features with intelligent feeding 			
Pump	<ul style="list-style-type: none"> * Built-in peristaltic pumps * Each feeding pump can run adjustable 15-step program * Each pump can be adjusted for speed, forward and backward direction, and manual or automatic mode * Each of the four peristaltic pumps can be designated for different functions: acid pump, base pump, antifoam pump, or substrate feeding pump * Optional fifth and six peristaltic pump available 			
Temperature	<ul style="list-style-type: none"> * Vessel temperature is measured with a side-inserted PT-100 temperature probe and maintained using PID control. * Control range: 0-130°C, $\pm 0.1^\circ\text{C}$. Operational range up to 0-60°C 			



Agitation	<ul style="list-style-type: none"> * Manual or automatic control of agitation speed * 15-step program to change speed, or use DO cascade control
Air supply and exhaust	<p>Gas supply and dehumidifier: uses in-house air compressor or air dehumidifier</p> <ul style="list-style-type: none"> * Includes re-useable, autoclavable 0.2µm air filter for gas inlet * Gas Inlet (air) Includes mass flow controller: 2 vvm maximum according to the vessel capacity * Gas Inlet (oxygen) Includes pure oxygen rotameter (manual flow control): 1 vvm maximum according to the vessel capacity * Includes oxygen gas solenoid valve, with automatic pulsed time control <p>Air outlet / Exhaust</p> <ul style="list-style-type: none"> * Exhaust port with stainless steel condenser * Includes re-useable, autoclavable 0.2µm air filter * Includes automated adjustable gas outlet valve to adjust vessel back pressure * Can control manually or automatically via software

Utility Requirement

Capacity	30 L	50 L	100 L	200 L
Power	Three phase 220V or 380V (note: can be customized to local standard)			
Air	At least 6 bar			
	60 L/min flow rate	100 L/min flow rate	200 L/min flow rate	400 L/min flow rate
	Dehumidified			
	Oil-free			
Peripheral factory water supply	Cooling water (tap water, at least 15°C below working temperature, must be soft water) ; Pressure at least 2 bar			
Process water	RO Water			
Plant steam	≥ 2 bar; dry steam with no entrained condensate			
Process steam	≥ 2 bar; dry steam with no entrained condensate			
Drain	In situ drain; ≥ 1"		In situ drain; ≥ 2"	

*Customization on the SIP Fermentation system available upon request. Please contact your regional manager for evaluation request.



(Production Scale)

*For system over 200L, please contact Major Science or authorized distributors for more information.



500L System

(Approx. 300Wx1900Dx360H cm)



1000L System

(Approx. 330Wx340Dx450H cm)



5000L System



■ Gas Mixing Station

The gas mixing station allows the user to optimize cell growth conditions by independently supplying up to four gasses to the fermentation process. Parameters such as dissolved oxygen and pH can be controlled by adjusting the gas composition supplied to the system. Four manually adjusted flow meters control the flow rate of each gas, while the 4 solenoid valves automatically open or close in response to the culture conditions. The Gas Mixing Station can be operated in either manual or automatic modes.

■ Oxygen Mass Flow Controller

Maintain optimal control over culture DO level by installing this optional mass flow controller. The mass flow controller can accurately adjust the flow rate of incoming oxygen and is resistant to fluctuations in gas pressure, ensuring precise control and repeatability of experimental conditions

A.) Cascade control scheme

B.) Integrated into controller for simple and automated operation

■ CO₂ / O₂ Off-gas Analyzer

The CO₂ / O₂ off-gas analyzer provides real-time measurement of carbon dioxide and oxygen concentration of the bioreactor exhaust gas. The CO₂ concentration is determined using a self-calibrating non-dispersion infrared sensor, while an electrochemical sensor monitors the oxygen concentration. Using this information, the user can continuously monitor metabolism and analyze cell growth parameters.

■ ORP Probe

The ORP probe measures the oxidation-reduction potential of the fermentation media, which is a crucial indicator of anaerobic conditions/reactions. This low maintenance and sterilizable probe is designed to withstand repeated experiment.



Electropolish (EP) of Vessel Tank

Electropolish of the vessel tank is offered as a higher sanitary grade surface finish. EP surface finish is an addition to the standard mechanical polish (MP) which provides a smoother surface area to minimize residual residue.

**Note that this option MUST be requested at your initial inquiry, later-on additions after completion of construction is not possible*

■ Transfer Piping

Transfer piping of your resulting product/medium between vessels is offered for convenience of operation.

Automated transfer using pressure in addition to directional control with valve regulations offers fast and easy operation.



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