version 1.0

Winpact

2024 Catalogue

Laboratory Bioreactors

INNOVATIVE CULTIVATION SOLUTIONS

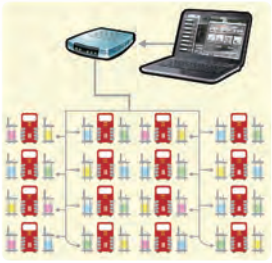
1 Single wall dish bottom vessel, 1 L
2 Double jacketed dish bottom vessel, 3 L
3 Single wall air lifter vessel, 5 L
4 Double jacketed air lifter vessel, 5 L

Benchtop System Overview

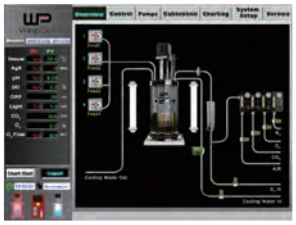
Winpact Parallel System (FS-05 Series)

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

1 3 4 5 8

*0°- 90° rotation, 120° for harvest

6

FS-05

2

*10L solid state vessel is fixable angle 30°only

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

1 2 3 4 5 6

FS-06

* All images are for reference only, actual products might differ from the pictures above.
* Technical specifications subject to change without notice.

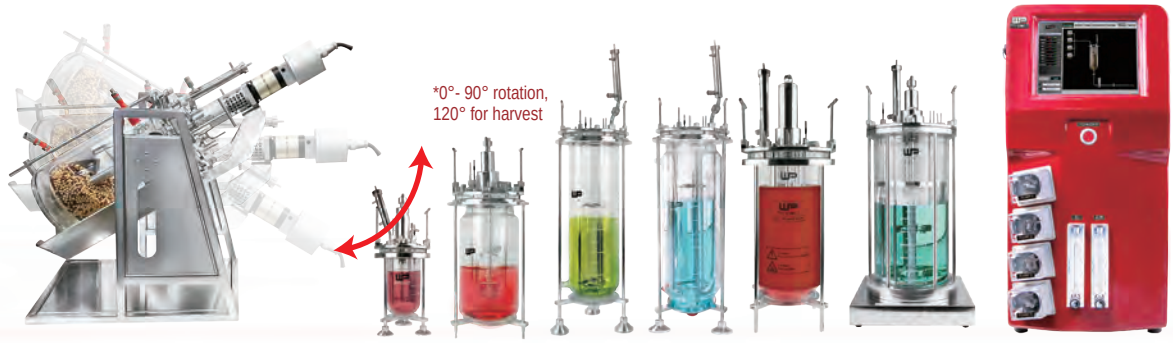
5 Single wall dish bottom vessel with heating blanket, 5 L
6 Single wall plain bottom vessel with heating base unit, 10 L
7 Double jacketed dish bottom vessel, 500 ml
8 Solid State, 5 L

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.
*10L solid state vessel is fixable angle 30°only



8 (FS-V-SA05P) 1 2 3 4 5 6 FS-07

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.

7 2

1 6

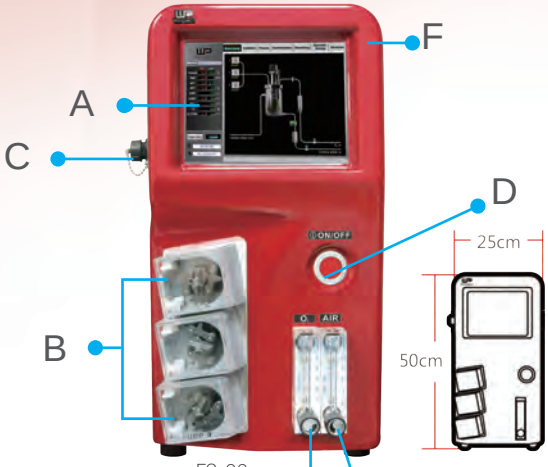
Now, Winpact Mass Flow Controller could be integrated into Winpact Fermentation system and achieve operational efficiency and creative stable environment in culture conditions.

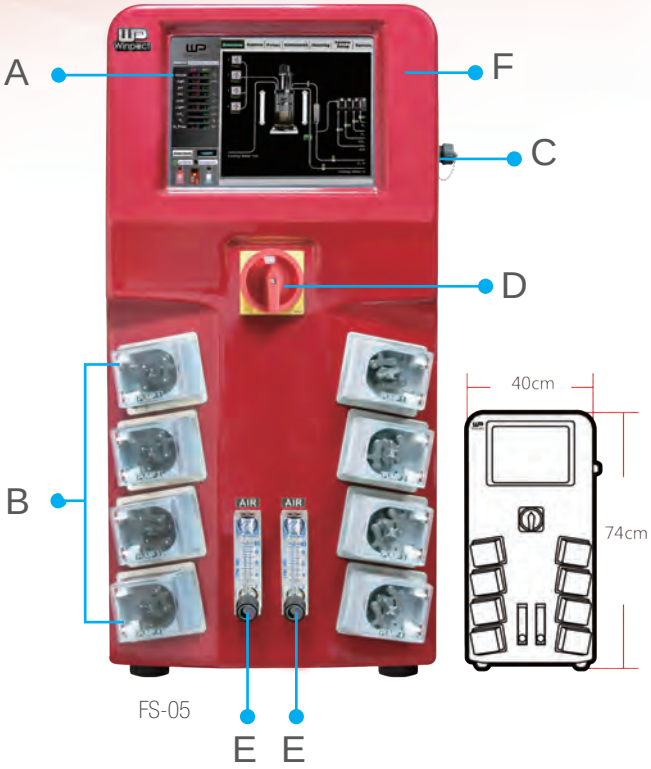
*For more information, please contact your local distributors.

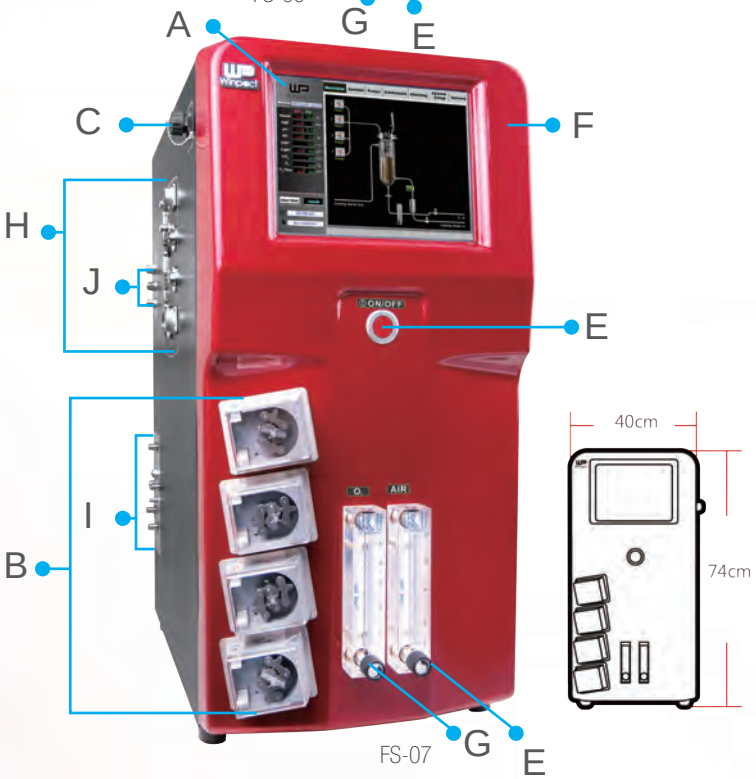
- Affordable price
- Self-made, high quality accurate gas control guarantee

Winpact Control System

■ Controller Layout

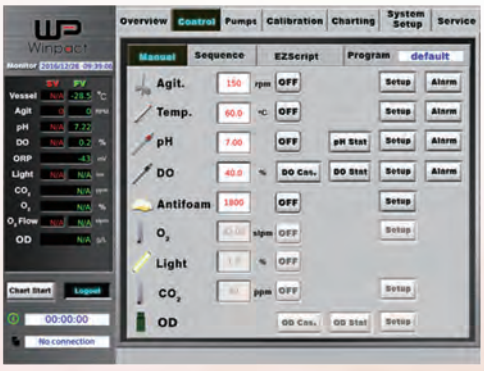






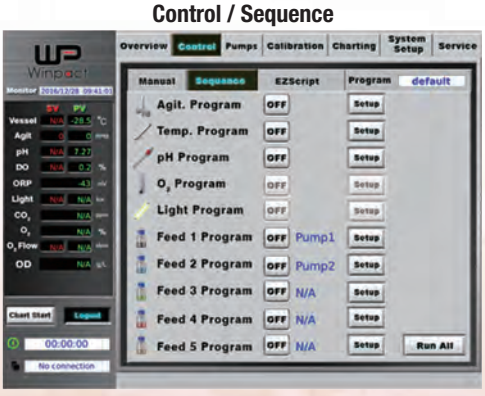
- A - Color touch screen
- B - Assignable & adjustable peristaltic pumps
- C - USB port for easy data transfer
- D - Power switch
- E - Adjustable air flow meter
- F - ABS flame retardant front panel
- G - Adjustable O_2 flow meter (optional)
- H - Connect area
- I - Water connect area
- J - Air & gas connect area

Control / Manual

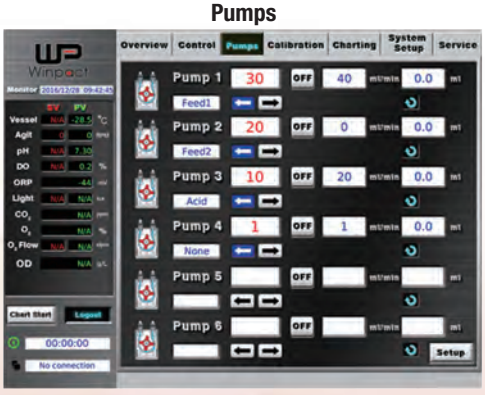


Perform manual, sequence or EZScript control (optional) of each parameter

Control / Sequence



Pumps



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

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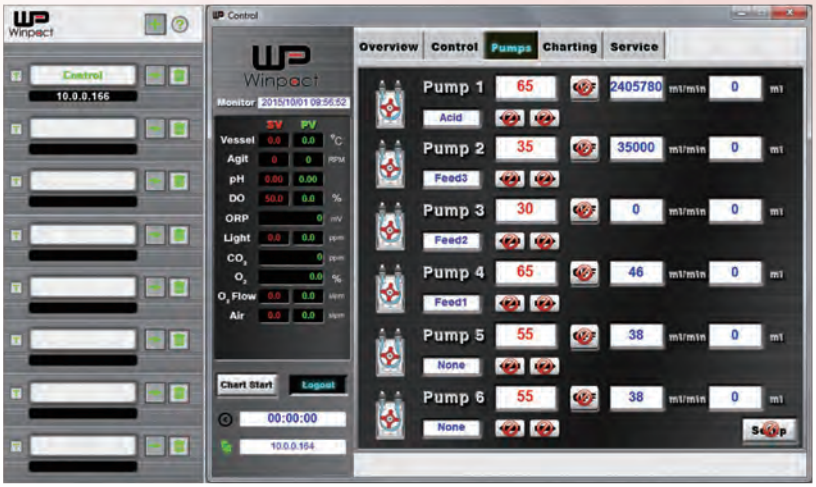


PC remote controlling software connects up to 16 systems

*PC and switch hub are not included

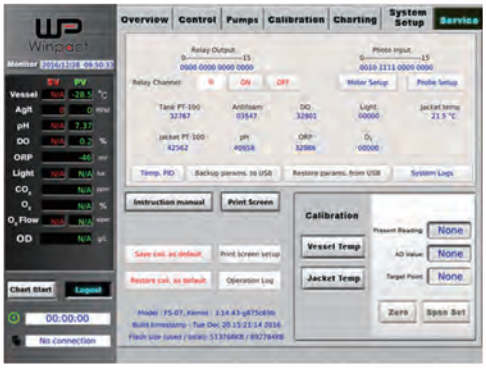
Overall Features:

- 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)

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

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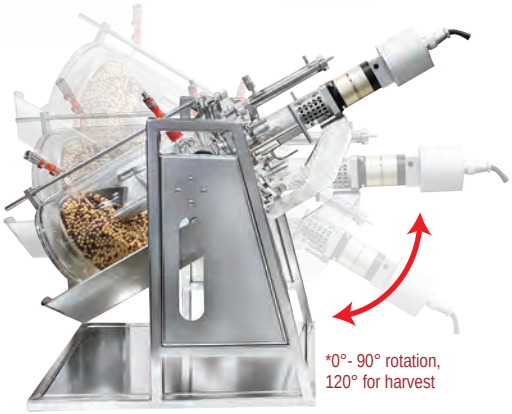
Winpact Parallel Fermentation System

10L Single Wall Vessel with Heating Base Unit

FS-05

1L Double Jacketed Vessel



5L Solid state (FS-V-SA05P)

*0°- 90° rotation, 120° for harvest

*10L solid state vessel is fixable angle 30°only

System Specification

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
	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.40 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-SA series)		
Working volume	1 L	3 L	5 L	10 L	15 L	20 L	3 L	5 L	10 L	3L	5L	10L
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	3.8L	6.8L	12.5L

*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 accomodate vessel with condenser attached

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Winpact

Specification

**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).

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 / Slide state 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 Slide state 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/progrmmable 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

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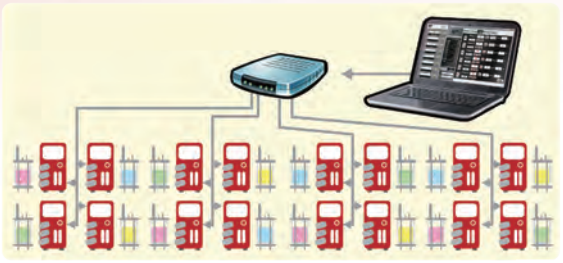
Winpact One Fermentation System

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				
	Air sparger assembled		Micro sparger assembled	Air sparger assembled	
Agitation motor	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.40 for details.				

* For FS-V-A, FS-V-B and FS-V-D series, the standard impeller is Rushton-type; pitchede 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 accomodate vessel with condenser attached

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Winpact

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

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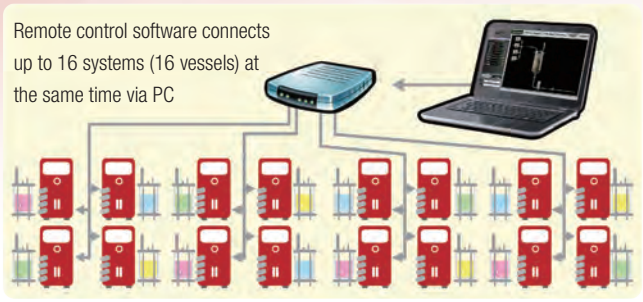
Winpact Evo Fermentation System

FS-07



*10L solid state vessel is fixable angle 30°only

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
	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.40 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-SA series)		
Working volume	1 L	3 L	5 L	10 L	15 L	20 L	3 L	5 L	10 L	3L	5L	10L
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	3.8L	6.8L	12.5L

*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 accomodate vessel with condenser attached

* All images are for reference only, actual products might differ from the pictures above.
* Technical specifications subject to change without notice.

**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 / Slide state 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); 30-700 rpm (15, 20L); 30-1000 rpm(10L) c. For Broken type/Spiral type/Anchor type impellers (only for Slide state 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

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* Technical specifications subject to change without notice.

Winpact Controller / Vessel Selection Guide

*10L solid state vessel is fixable angle 30°only

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-SA series)
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	3L, 5L, 10L
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 *The minimum speed varies from 1-5 rpm depending on actual medium density.
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.

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* Technical specifications subject to change without notice.

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-SA series)		
Material	Borosilicate glass / 316L stainless steel for headplate and all fittings		
Working volume **	3L	5L	10L
Total volume Δ	3.8L	6.8L	12.5L

** Suggested Max.

Δ Total volumes are approximate and may vary slightly
*10L solid state vessel is fixable angle 30°only

Vessel Application

Application \ Vessel	FS-V-A series Double Jacketed Dish Bottom Vessel	FS-V-B series Single Wall Dish Bottom Vessel	FS-V-C series Air Lifter Vessel	FS-V-B series Single Wall Dish Bottom Vessel with Heating Blanket	FS-V-D series Single Wall Plain Bottom Vessel with Heating Base Unit	FS-V-SA series 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

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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 very 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

*10L solid state vessel is fixable angle 30°only

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 tiling 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

Specification

Vessel	Model	FS-V-SA03P	FS-V-SA05P	FS-V-SA10P
	Working volume	3L	5L	10L
	Total volume	3.8L	6.8L	12.5L
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 – 6 LPM	0, 1 – 10 LPM	0, 1 – 20 LPM
Dimension	Dimension	Overall Diameter 315mm; Overall Height with Condenser 633 mm; Overall Height without Condenser 388 mm Dimension (with vessel holder) 430mm (L) x 730mm (W) x 780 mm (H)	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)	Overall Diameter 385mm; Overall Height with Condenser 815 mm; Overall Height without Condenser 750 mm Dimension (with vesselstand) 1120mm (L) x 320mm (W) x 695 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	FS-A-IM306	FS-A-IM307
		2. Anchor type: FS-A-IM408	FS-A-IM406	FS-A-IM409
		3. Spiral type: FS-A-IM507	FS-A-IM506	FS-A-IM508
		(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		Vessel stand with fixed angle 30°
		Harvest mode: 0°/ 120°		N/A
	Control Mode	Programmable control		N/A

FS-V-SA10
10L Solid Vessel

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