

## Thermostat System with Double Jacketed Dish Bottom Vessel

### Description

The double jacketed vessel is specially designed for temperature sensitive and shear-force sensitive cells such as mammalian and insect cell culture. With the thermostat system and pitched-blade impeller design, fragile cells can be gently mixed and cultivated for a long period of time without damaging cells themselves. The 2-stage DO cascade control ability allows users to maintain DO level automatically by changing agitation speed or introducing pure oxygen. Full accessories are offered as a standard package. In addition to that, our technical support team can help you tackle with difficult problems and give you immediate service for your cultivation work.



### Features

- **Double jacketed vessel** provides sophisticated temperature control
- **Pitched-blade impellers** design for fragile cell lines
- **Colorful touch screen and Graphical user interface** for easy operation
- **2-stage DO cascade** for precise DO(Dissolved oxygen) level control
- **Real-time trend data recording** ensures best fermentation performance
- **Ethernet remote control** ability allows you navigate and operate your fermentation process from your desktop
- **No additional software required**
- **Low voltage DC brushless motor**
- **Quick connectors** for easy operation
- **4 built-in assignable and programmable peristaltic pump** for automatic pH, Antifoam and Feeding control
- **Full accessories** are offered as a standard package

### Application:

Ideal for temperature sensitive and shear-force sensitive cells such as mammalian and insect cell culture.

Thermostat System with Double Jacketed Dish Bottom Vessel

## INNOVATIVE CULTIVATION SOLUTIONS

Thermostat System with Double Jacketed Dish Bottom Vessel includes:

Controller	Thermostat System Controller
	Built-in rotameter
	4x built-in pump head
Vessel	Double jacketed vessel (includes glass body, head plate, T handing bar, 2 probe adaptors)
	2 pcs of adjustable Pitched-blade impeller
	Baffle assembly
	Condenser assembly
	Air sparger assembly
Motor	Agitation motor
Probes	1x pH probe and 1x pH cable
	1x DO probe and 1x DO cable
	1x Temperature probe and 1x Temperature cable
	1x Foam/Level Sensor and 1x Foam/Level Sensor cable
Start-up Kit	Please see Page 43



## Thermostat System with Double Jacketed Dish Bottom Vessel

### Specification

Vessel	Working volume(Liter)	3L	5L	7L	10L
		Total volume(Liter)	3.8	6.8	8.9
Control unit	Material	Borosilicate glass / 316L stainless steel for headplate and all fittings			
	Control panel	10.4" Colorful touch-screen interface			
	Communication port	Remote control through Ethernet (SCADA)			
		Data export through USB port RS-485 port for system extension			
	Program storage	Up to 59,994 process programs			
	Log data storage	Up to 10 process monitoring data files			
	Cabinet material	ABS front panel and painted iron housing			
	Dimension	Footprint: W x D = 400 x 500 mm (15.75" x 19.69") Height = 740 mm (29.13")			
Rated voltage	110V or 220V; 50/60 Hz				
Aeration	Inlet gas flow-meter	0, 1 – 10 LPM		0, 2 – 20 LPM	
	Sparger	Orifice ring			
	Baffle	Removable 316L stainless steel baffles			
Temperature	Control system	Thermostat system; Built-in heat exchanger (400 W heater/water circulation pump); Automatic cooling water valve			
	Range	5°C (41°F) above coolant up to 60°C (140°F)			
	Resolution	0.1°C			
	Probe	Platinum RTD probe (Pt 100)			
Agitation	Control mode	Programmable 15 steps PID control			
	Drive	Removable top brushless motor			
	Speed range	Two agitation motor types: a. For fermentation and cell culture: 30 – 1200 rpm b. For extremely shear-force sensitive cell line: 5 – 300 rpm (optional)			
	Resolution	1 rpm			
	Impeller	Two impeller types: a. For shear-sensitive cell culture: 2 pcs of adjustable Pitched-blade impeller b. For fermentation: 3 pcs of adjustable Rushton-type impeller (optional) Note: Customized impellers are available			
pH	Control mode	Programmable 15 steps PID control			
	Range	2 -14 pH			
	Resolution	0.01 pH			
	Probe	Gel-filled electrode; Autoclavable			
DO	Control mode	PID, One point control with adjustable dead band			
	Range	0 – 200%			
	Resolution	0.1%			
	Probe	Polarographic DO sensor; Autoclavable			
ORP	Control mode	Cascade function to response to a. Increase or decrease agitation speed b. Oxygen enrichment module (optional) c. Start substrate feeding program			
	Measurement range	-/+ 2000 mV			
	Resolution	1 mV			
Foam	Probe	Gel-filled electrode; Autoclavable (optional)			
	Probe	316L stainless steel protector with insulated teflon tube; On/Off control			

Peristaltic pump	Pump number	4 Built-in pumps; One external pump (optional, RS-485 interface with relay output)
	Motor type	Precise stepping motor; minimum speed is 1 rpm
	Speed range	0 – 65 rpm
	Resolution	1 rpm
	Control mode	Programmable 15 steps feeding control; Pump can be assigned for Acid, Base, Antifoam and Substrate
Exhaust	Device type	316L stainless steel condenser
Utility requirement	Power supply	100-120V 50/60Hz or 210-230V 50/60Hz with electrical safety cutoff switch
	Water	2 Bar maximum (29 psi)
	Air	1 Bar maximum, must be dry, oil-free and filtered (14.5 psi)
	Autoclave	For sterilization

### Ordering Information

Cat. No.	Description
FS-01-A03P-110/ 220V	Complete Thermostat Fermentation System for 3L Double Jacketed Vessel, 110V/ 220V
FS-01-A05P-110/ 220V	Complete Thermostat Fermentation System for 5L Double Jacketed Vessel, 110V/ 220V
FS-01-A07P-110/ 220V	Complete Thermostat Fermentation System for 7L Double Jacketed Vessel, 110V/ 220V
FS-01-A10P-110/ 220V	Complete Thermostat Fermentation System for 10L Double Jacketed Vessel, 110V/ 220V

Controller (includes Thermostat System Controller, Built-in rotameter and 4x built-in pump head)	
FS-01-110/ 220V	Winpact Thermostat System Controller, 110V/ 220V
Vessels (includes Double jacketed vessel, 2 pcs of adjustable Pitched-blade impeller, Baffle assembly, Condenser assembly and Air sparger assembly)	
FS-V-A03	3L Double Jacketed Vessel
FS-V-A05	5L Double Jacketed Vessel
FS-V-A07	7L Double Jacketed Vessel
FS-V-A10	10L Double Jacketed Vessel
Optional item	
FS-O-ORP-101	ORP monitoring kit, includes 120mm ORP probe, ORP probe cable, probe adaptor
FS-O-ORP-102	ORP monitoring kit, includes 225mm ORP probe, ORP probe cable, probe adaptor
FS-O-ORP-103	ORP monitoring kit, includes 325mm ORP probe, ORP probe cable, probe adaptor
FS-O-ORP-104	ORP monitoring kit, includes 425mm ORP probe, ORP probe cable, probe adaptor
FS-O-M3	Agitation Motor, 5-300rpm for 3, 5, 7, 10L Vessel
FS-O-OE	O <sub>2</sub> Enrichment Module, includes Oxygen Enrichment Valve and Adjustable Flow Meter

# Standard Accessory Items

## pH probe

### Description

The glass body pH electrode is designed for improved performance. The automated manufacturing process results in better repeatability and increases reliability of these electrodes in bioprocess applications such as cell culture and fermentation.

### Features

- Fast response
- Highly repeatable
- Proven reliability
- High resolution
- Suitable for autoclave, SIP and CIP

### Specification

pH	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 Pt100 (VP model)

### Ordering Information

Cat. No.	Description
FS-A-PPH00	pH Probe Cable, 6ft.
FS-A-PPH01	120mm pH Probe
FS-A-PPH02	225mm pH Probe
FS-A-PPH03	325mm pH Probe
FS-A-PPH04	425mm pH Probe



## DO probe

### Description

The re-buildable dissolved oxygen sensors is designed for superior performance. The semi-automated manufacturing process results in repeatability and improves reliability of these sensors in bioprocess applications such as cell culture and fermentation.

### Features

- Fast response
- Highly repeatable
- Proven reliability
- High resolution
- Suitable for autoclave, SIP and CIP

### Specification

Measurement	Polarographic
Dissolved Oxygen	0.1 - 200% 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 Materials	316L S.S.
Shaft Diameter	12mm
Surface Finish	Ra 12 (electro-polish)

### Ordering Information

Cat. No.	Description
FS-A-PDO00	DO Probe Cable, 6ft., D4 Type
FS-A-PDO01	120mm DO Probe
FS-A-PDO02	225mm DO Probe
FS-A-PDO03	325mm DO Probe
FS-A-PDO04	425mm DO Probe



# Standard Accessory Items

## Temperature probe

### Description

This temperature probe will be put in a stainless steel tube to detect the vessel temperature through the surrounding liquid, like water. It can be used in all kinds of fermentation situation.

### Features

- High accuracy Pt100 sensors - Platinum resistance thermometers (PRTs)
- Customized length - we offer the most suitable probe lengths for different vessel sizes.
- Highly repeatable
- Proven reliability

### Specification

Housing Material	316L stainless steel
Accuracy	+/- 0.2°C
Resolution	0.1°C

### Ordering Information

Cat. No.	Description
FS-A-PPT00	Temperature Probe Cable
FS-A-PPT02	250mm Temperature Probe
FS-A-PPT03	350mm Temperature Probe
FS-A-PPT05	550mm Temperature Probe



## Antifoam probe

### Description

The antifoam probe can be equipped with our controllers and all kinds of vessels. The presence of foam in the reactor vessel is detected by measurement of the electrical conductivity, and then the controller will pump some defoamer to clean the foam to ensure the experiment goes well.

### Features

- Height can be adjusted
- Made up with stainless steel tips and Teflon body
- Highly repeatable
- Proven reliability

### Specification

Housing Material	Stainless steel tips and Teflon body
Sensitivity	Adjustable

### Ordering Information

Cat. No.	Description
FS-A-PLV00	Foam/Level Sensor Cable
FS-A-PLV01	Foam/Level Sensor



# Standard Accessory Items

## Brushless motor

### Description

The brushless motor can be equipped with our different fermentation controllers to avoid adding carbon powder. The lower voltage design also provides higher safety concerns to the operators.

### Features

- Low noise
- Low vibration
- Proper torque
- Smooth run
- Long life time

### Specification

Motor Type	24V DC Brushless motor
Connection with vessel	Quick connector, no tools required

### Ordering Information

Cat. No.	Description
FS-M1	Agitation Motor, 30-1200rpm for 3, 5, 7, 10L Vessel (Standard)
FS-M2	Agitation Motor, 30-1200rpm for 15, 20L Vessel (Standard)
FS-O-M3	Agitation Motor, 5-300rpm for 3, 5, 7, 10L Vessel (Optional)
FS-O-M4	Agitation Motor, 5-300rpm for 15, 20L Vessel (Optional)





# Impeller

## Description

We offer two modes of impeller, the rushton 6-blade impeller and the pitched blade impeller. We are also capable to deliver the customized impellers.

## Features

- Rushton 6-Blade Impeller
  1. Available for the agitator assemblies, both lipseal and magnetically coupled types
  2. Fits onto the standard 8 mm diameter shaft
  3. M3 x 5 mm hex set-screw
- Pitched Blade Impeller
  1. More efficient than flat blade impeller
  2. Flow is discharged both axially and radially depending on the angle

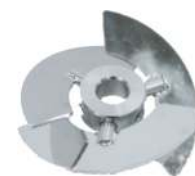
## Ordering Information

Cat. No.	Description
FS-A-IM103	Rushton 6-Blade Impeller for 3 Liter Vessel, 3 ea/pk
FS-A-IM105	Rushton 6-Blade Impeller for 5 Liter Vessel, 3 ea/pk
FS-A-IM107	Rushton 6-Blade Impeller for 7 Liter Vessel, 3 ea/pk
FS-A-IM110	Rushton 6-Blade Impeller for 10 Liter Vessel, 3 ea/pk
FS-A-IM115	Rushton 6-Blade Impeller for 15 Liter Vessel, 3 ea/pk
FS-A-IM120	Rushton 6-Blade Impeller for 20 Liter Vessel, 3 ea/pk



Rushton 6-Blade Impeller

Cat. No.	Description
FS-A-IM203	Pitched Blade Impeller for 3 Liter Vessel, 2 ea/pk
FS-A-IM205	Pitched Blade Impeller for 5 Liter Vessel, 2 ea/pk
FS-A-IM207	Pitched Blade Impeller for 7 Liter Vessel, 2 ea/pk
FS-A-IM210	Pitched Blade Impeller for 10 Liter Vessel, 2 ea/pk
FS-A-IM215	Pitched Blade Impeller for 15 Liter Vessel, 2 ea/pk
FS-A-IM220	Pitched Blade Impeller for 20 Liter Vessel, 2 ea/pk



Pitched Blade Impeller

## Optional Accessory Items

### ORP probe

#### Description

The ORP probe with gel-type or liquid-type electrolyte or solid polymer reference system, all with open junction, obviate the need to pressurize the electrode through the housing. The gel electrode is pre-pressurized and the polymer reference system is (process) pressure-resistant. These types of electrode cannot be refilled and therefore require reduced maintenance.

It is widely used for routine measurements, particularly in applications involving media with a high fouling potential. Many models enable temperature-compensated measurements and enhanced sensor diagnostics.

#### Features

- Longer lifetime: Open junction design instead of fine-pore ceramic diaphragm(s), as the junction is less likely to clog. Ideal for applications in media with high contaminating potential, such as emulsions, suspensions etc..
- Patented silver-ion trap: Patented silver-ion trap in certain models, for use in solutions with strong sulfide content.
- Better process control: Through models with temperature compensation feature (RTD).
- Versions with higher temperature resistance: Suitable for sterilization, autoclaving and CIP procedures.

#### Ordering Information

Cat. No.	Description
FS-O-ORP-101	ORP monitoring kit, includes 120mm ORP probe, ORP probe cable, probe adaptor
FS-O-ORP-102	ORP monitoring kit, includes 225mm ORP probe, ORP probe cable, probe adaptor
FS-O-ORP-103	ORP monitoring kit, includes 325mm ORP probe, ORP probe cable, probe adaptor
FS-O-ORP-104	ORP monitoring kit, includes 425mm ORP probe, ORP probe cable, probe adaptor

Accessories	
FS-A-PORP01	120mm ORP Probe, Measurement Range from -2000~2000mV
FS-A-PORP02	225mm ORP Probe, Measurement Range from -2000~2000mV
FS-A-PORP03	325mm ORP Probe, Measurement Range from -2000~2000mV
FS-A-PORP04	425mm ORP Probe, Measurement Range from -2000~2000mV



## External Pump

### Description

MU-D digital controlled peristaltic pump series is not only an ideal instrument for a variety of applications, but also a designed device as the external pump for the Winpact product portfolio.

MU-D series is capable to connect with the Winpact system and to be controlled from the Winpact system.

The easy-to-use pump design allows for several different silicon tubing sizes to be fitted. This gives the user a wider variety of flow rates. The MU-D series is also reversible providing better convenience and flexibility to the user. The digital control provides high accurate speed performance.

### Features

- Microprocessor controller
- Compact size
- Easy load pump head
- Wide applications
- Reversible for purging

### Specification

Peristaltic pump	MU-D01	MU-D02
Rpm	20-300rpm	5-600rpm
Motor size	50W	100W
Motor type	DC Brushless motor	
Number of rollers	3	
Variable flow rate	1.2 ~1,140ml/min	0.3 ~2,280ml/min
Operating temperature	Ambient to 40°C (104°F)	
Unit material	Painted iron metal	
Unit dimension	200 x 340 x 130mm (W x L x H)	
Rated voltages	110V / 220V selectable	100~240V
Weight	approx. 5.6kg	

### Ordering Information

Cat. No.	Description
MU-D01	MU-D01 Peristaltic Pump, 110V / 220V
MU-D02	MU-D02 Peristaltic Pump, 100V~ 240V

Accessories	
MU-S13	Silicon tube I.D. 1/32" (0.8 mm), 25 ft (7.6 m)
MU-S14	Silicon tube I.D. 1/16" (1.6 mm), 25 ft (7.6 m)
MU-S16	Silicon tube I.D. 1/8" (3.1 mm), 25 ft (7.6 m)
MU-S25	Silicon tube I.D. 3/16" (4.8 mm), 25 ft (7.6 m)
MU-S17	Silicon tube I.D. 1/4" (6.4 mm), 25 ft (7.6 m)
MU-S18	Silicon tube I.D. 3/8" (9.5 mm), 25 ft (7.6 m)

Cat. No. :MU-D01



Cat. No. :MU-D02



## Optional Accessory Items

### O<sub>2</sub> Enrichment Module

#### Description

The O<sub>2</sub> enrichment module is an optional device for aerobic fermentation process. It enables the Winpact system to provide the environment for higher oxygen required cells and high cell density fermentation process.

#### Features

- Aerobic environment maintenance
- Designed for high oxygen required cells and high cell density
- Precisely control DO level

#### Ordering Information

Cat. No.	Description
FS-O-OE	O <sub>2</sub> Enrichment Module, includes Oxygen Enrichment Valve and Adjustable Flow Meter



## Consumable Parts

### Ordering Information

Cat. No	Description
FS-A-SK	Winpact Fermentation System Start-up Kit, Includes 4 x 250 ml Glass Feeding Bottles, 1 x 500 ml Glass Feeding Bottle, 10 x 45 mm 0.2 µm Autoclavable Disc Type Filters, 15 x Connecting Tubes, 20 x Silicon Tubing Clamps, 25 ft of 1/8 inch (3.1 mm) Silicon Tube, 1 x Handy Burner, 1 x 2 mm Hex Wrench , and 1 x 12 mm & 14 mm Double Open-end Wrench
FS-A-SK01	250 ml Glass Feeding Bottle, Includes Two Stainless Steel Connecting Ports
FS-A-SK02	500 ml Glass Feeding Bottle, Includes Two Stainless Steel Connecting Ports
FS-A-SK03	45 mm, 0.2 µm Autoclavable Disc Filter, 10 ea/pk
FS-A-SK04	50 mm, 4.5 mm (L) Stainless Steel Connecting Tube, 15 ea/pk
FS-A-SK05	Handy Burner
FS-A-SK06	Silicon Tubing Clamp, 20 ea/pk
FS-A-SK07	2 mm Hex Wrench
FS-A-SK08	12 mm & 14 mm Double Open-end Wrench
MU-S13	Silicon tube, I.D. 1/32"(0.8 mm) 25 ft (7.6 m)
MU-S14	Silicon tube, I.D. 1/16"(1.6 mm)25 ft (7.6 m)
MU-S16	Silicon tube, I.D. 1/8"(3.1 mm) 25 ft (7.6 m)
MU-S25	Silicon tube, I.D. 3/16" (4.8 mm) 25ft (7.6 m)
MU-S17	Silicon tube, I.D. 1/4" (6.4 mm)25 ft (7.6 m)
MU-S18	Silicon tube, I.D. 5/16"(7.9 mm) 25 ft (7.6 m)

### Silicon Tube and Typical Rate

Cat. No.	MU-S13	MU-S14	MU-S16	MU-S25	MU-S17	MU-S18
Inside diameter in. (mm)	0.03 (0.8)	0.06 (1.6)	0.12 (3.1)	0.19 (4.8)	0.25 (6.4)	0.31 (7.9)
Hose barb size in. (mm)	1/16 (1.6)	1/16 (1.6)	1/8 (3.2)	3/16 (4.8)	1/4 (6.4)	3/8 (9.5)
Flow range with 6 to 600 rpm drive mL/min	0.36 to 36	1.3 to 130	4.8 to 480	10 to 1000	17 to 1700	23 to 2300
Maximum pressure, continuous	25 psig (1.7 bar)			20 psig (1.4 bar)	15 psig (1.0 bar)	10 psig (0.7 bar)
Maximum pressure, intermittent	40 psig (2.7 bar)			35 psig (2.4 bar)	20 psig (1.4 bar)	15 psig (1.0 bar)
Maximum vacuum	26" Hg (660 mm Hg)				20" Hg (510 mm Hg)	
Suction lift	29 ft H <sub>2</sub> O (8.8 m H <sub>2</sub> O)				22 ft H <sub>2</sub> O (6.7 m H <sub>2</sub> O)	



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