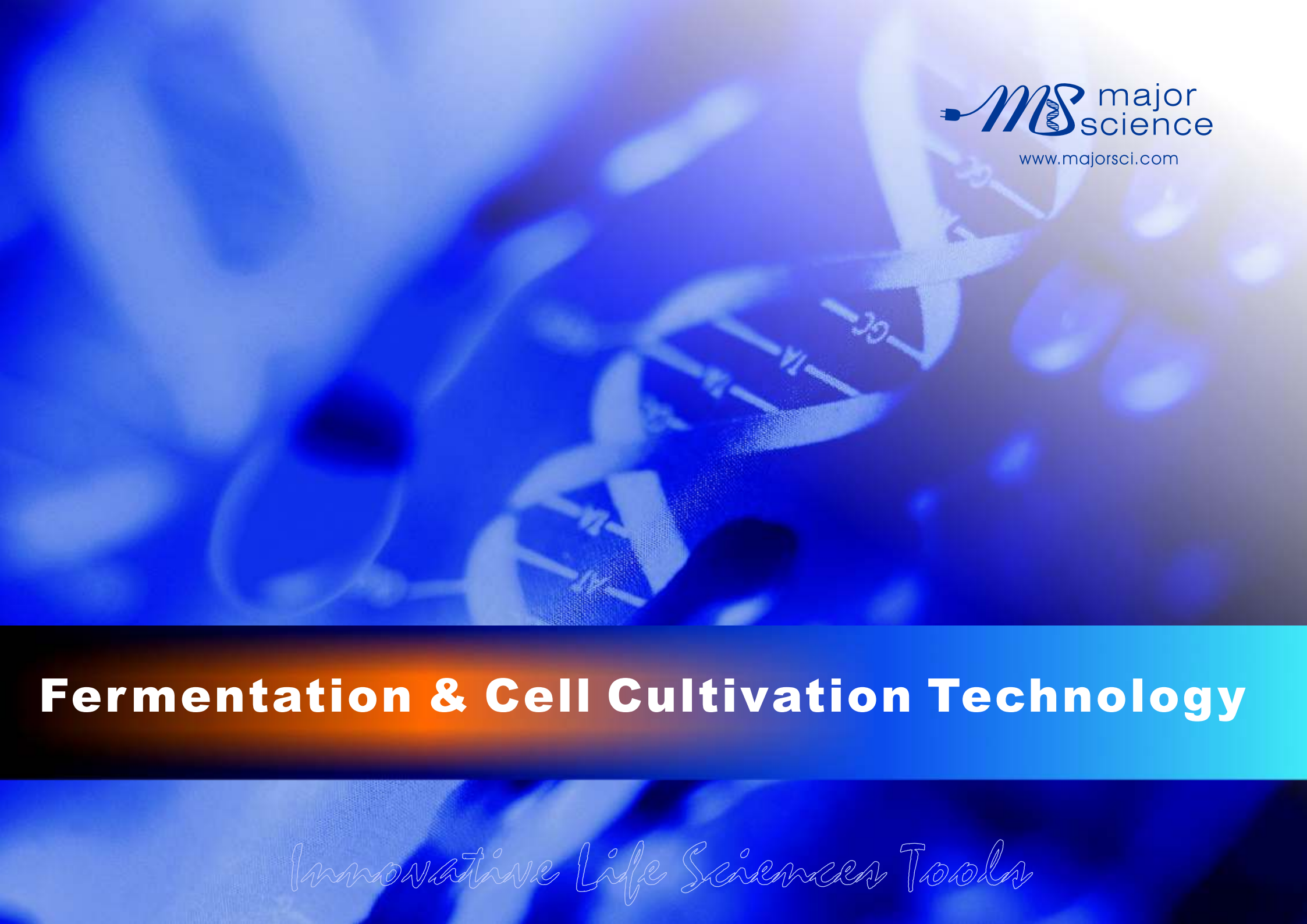
major science
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Fermentation & Cell Cultivation Technology
Innovative Life Sciences Tools


Temp : 0.0 Rpm : 0.0
F1
F2
F3
F4
F5
RPM
TEMP
pH
FEED
PUMP
AIR
DO
PUMP 1
PUMP 2
PUMP 3
Manual
Manual
Manual
Manual

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content

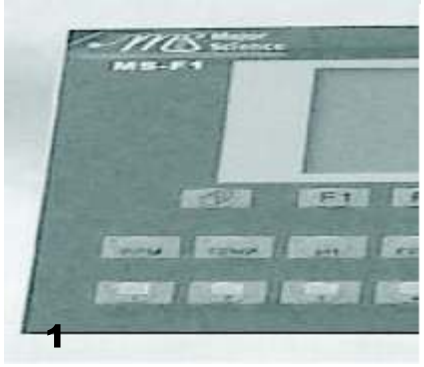
Superior Bioreactor

Innovative Life Sciences Tools

The Superior Bioreactor is a compact, autoclavable laboratory bioreactor system for a wide variety of culture research in research, educational and industrial applications.
This system is offered in a complete package, including all the associated instruments and accessories

Feature :

- Integrated thermostat and dry heating system
- Easy Operated control panel
- Powerful control system
  - Cascade function to maintain DO setpoint
  - pH state function
  - 15 steps programming function for agitation; feeding time and temperature
- Built in a air diaphragm pump
- Wide range of autoclavable vessels
- Included 4 sets of stepping motor to drive peristaltic pumps precisely, the range is from 1 to 100 rpm
- Fully complete accessories package
- System expansion are available for
  - Exhaust gas analysis
  - Mass Flow meter for each air
  - On line cell density monitor



Superior Bioreactor

MS-B Series

Application :

for cultivation of mammalian ; plant; insect cells and microbial

Specification

Vessel type	Jacket Vessel			
Vessel total volume	3L	5L	7L	10L
Height / diameter	253/130mm	330/150 mm	357/160 mm	400/190 mm
Aeration	Built in air diaphragm pump / Single orifice sparger			
Inlet gas flow meter	Adjustable 5L/min		Adjustable 10L /min	
Outlet gas	Stainless steel condenser			
Mechanical seal	Single mechanical seal			
Driver	Removable top driver "Brush-less" motor ;			
Agitation speed	20~300 rpm			
	15 steps programmable controller			
Temperature controller	15 steps programmable PID controller			
Temperature control system	Choice of thermostat and dry heating system **Thermostat system** (for jacket vessel): * Heating exchanger built in 400 W heater and circulation pump * Automatic controller cooling water valve *Temperature range 8℃ above cooling water up to 60℃ **Dry heating system** (for single wall vessel): * Plug connector for bottom heating unit * Automatic controlled cooling water valve for cooling coil * Temperature up to 90℃			
Temperature probe	Pt 100 ; 0~90℃ ;±0.1°C			
pH probe	Autoclavable; pH 2~12 ;± 0.01			
DO	Autoclavable, 0~100%			
Antifoam probe	316 stainless steel insulated with PTFE tube ; on/off controller			
Easy load pump	4 ea of easy load pump head ; Fifth pump for option			
	Pumps can be assigned for different functions			
	Speed is adjustable ; from 0 to 100 rpm			
	15 steps programmable feeding application			
Communication port	RS 485			
Other accessories	a. 250 ml media bottle x 4 ea			
	b. 500 ml media bottle x 1 ea			
	c. 1,000 ml media bottle x 1 ea			
	d. #16 silicon tube (25 ft/pk) x 2 ea			
	e. 2 ports of stainless steel stopper x 1 ea			
	f. Stainless steel stopper x 2 ea			
	g. Stainless steel feeding tube x 10 ea			
	h. Gas mixing station (for more detail, please see on page) x 1 set			

Control Unit :

- Stainless steel housing
- Digital control for pH; DO; temperature; agitation; peristaltic pump
- Calibration function for pH; DO
- Built in air diaphragm pump
- Multi-control function
  * Manual mode
  * DO cascade stage to response for agitation, substrate feeding
  * Programming control loop :
    -- 15 steps of temperature control
    -- 15 steps of agitation control
    -- 15 steps of substrate feeding control
  * pH state

Agitation

- Top driving motor
- Maintenance free Brushless motor
- Speed range is from 50 to 1200 rpm

Temperature Control System

- Integrated two temperature control systems. And it can be chosen depending on different type of vessel.

Thermostat system (for jacket vessel):

* Heating exchanger built in 400 W heater and circulation pump
* Automatic controller cooling water valve
* Temperature range 8℃ above cooling water up to 60℃

Dry heating system (for single wall vessel):

* Plug connector for bottom heating unit
* Automatic controlled cooling water valve for cooling coil
* Temperature up to 90℃

Air Flow Rate Control

- Adjustable precision rotameter
- Built in a air diaphragm pump

Gas Mixing station

- Flow meter
  * 4 Flow meter with accuracy regulator.
  * Maximun flow rate : 82 ccmAir
  * Scale : 65 line
- Valves : 4 solenoid valves
- Inputs : 4 gas inputs (oxygen; carbon dioxide and nitrogen and air)
- Output : 1 gas stream output (to sparger)
- Maximum Gas Pressure : 10 PSI

Peristaltic pump

- 4 sets of peristaltic pump
- Easy tube load pump head
- Driving via stepping motor
- Accurate rpm control, even on 1 rpm
- Include a manual and a reversible switch

Software

- Fully Windows compliant
- Set-point remote control on control loop function
- Data can be exported in Excel for further analysis
- Graphical display
  * Online Graphic
  * History Graphic

Vessel

- 3 to 10 L jacket vessel
- Medium contacted parts are made from Stainless Steel 316
- Mirror polish head plate
- Stirrer shaft with single mechanical seal
- Head plate with maximum number of ports
- Full range of accessories

System expansion are available for

- Exhaust gas analysis
- Mass Flow control for each air
- On line Cell Density Monitor
- Circulation Cooling Water Bath

Advanced Fermentor

Innovative Life Sciences Tools

The Advanced Fermentor is a compact, autoclavable laboratory scaled fermentation system. This fermentor is recognized as a very reliable and high prodcutivity system for a wide variety of cell types. It is ideal for research, educational and industrial applications.
This system is offered in a complete package, including all the associated instruments and accessories

Feature :

- Easy Operated control panel
- Powerful control system
  - Cascade function to maintain DO setpoint
  - pH state function
  - 15 steps programming function for agitation; feeding time and temperature
- Built in a air diaphragm pump
- Wide range of autoclavable vessels
- Included 4 sets of stepping motor to drive peristaltic pumps precisely, the range is from 1 to 100 rpm
- Fully complete accessories package
- System expansion are available for
  - Exhaust gas analysis
  - Mass Flow meter for each air
  - On line Cell Density Monitor
  - O_2 Enrichment valve with rotameter

Advanced Fermentor

MS-F Series

Application :

for cultivation of plant ; insect cells and microbial

Specification

Vessel type	Single Wall Vessel			
Vessel working volume	3L	5L	7L	10L
Height / diameter	260/130mm	320/160 mm	360/180 mm	400/200 mm
Aeration	Built in air diaphragm pump / Single orifice sparger			
Inlet gas flow meter	Adjustable 5L/min		Adjustable 10L /min	
Outlet gas	Stainless steel condenser			
Mechanical seal	Single mechanical seal			
Driver	Removable top driver "Brush-less" motor ;			
Agitation speed	100~1,200 rpm			
	15 steps programmable controller			
Temperature controller	15 steps programmable PID controller			
Cooling	Cooling coil on inner of vessel with control valve			
Heating	Bottom heating plate			
Temp probe	Pt 100 ; 0~90°C ;± 0.1°C			
pH probe	Autoclavable; pH 2~12 ;± 0.01			
DO	Autoclavable, 0~100%			
Antifoam probe	316 stainless steel insulated with PTFE tube ; on/off controller			
Easy load pump	4 ea of easy load pump head ; Fifth pump for option			
	Pumps can be assigned for different functions			
	Speed is adjustable ; from 0 to 100 rpm			
	15 steps programmable feeding application			
Communication port	RS 485			
Other accessories	a. 250 ml media bottle x 4 ea			
	b. 500 ml media bottle x 1 ea			
	c. 1,000 ml media bottle x 1 ea			
	d. #16 silicon tube (25 ft/pk) x 2 ea			
	e. 2 ports of stainless steel stopper x 1 ea			
	f. Stainless steel stopper x 2 ea			
	g. Stainless steel feeding tube x 10 ea			

Advance Fermentor

Control Unit :
- Stainless steel housing
- Digital control for pH; DO; temperature; agitation; peristaltic pump
- Calibration function for pH; DO
- Built in air diaphragm pump
- Multi-control function
  * Manual mode
  * DO cascade stage to response for agitation, substrate feeding
  * Programming control loop :
    -- 15 steps of temperature control
    -- 15 steps of agitation control
    -- 15 steps of substrate feeding control
  * pH state

Agitation
- Top driving motor
- Maintenance free Brushless motor
- Speed range is from 100 to 1200 rpm

Bottom heating Temperature Control System
- Fermentor base unit built in the heating material
- Automatic controlled cooling water valve for cooling
- Temperature controlled from 0 to 90 ℃

Air Flow Rate Control
- Adjustable precision rotameter
- Built in a air diaphragm pump

Peristaltic pump
- 4 sets of peristaltic pump
- Easy tube load pump head
- Driving via stepping motor
- Accurate rpm control, even on 1 rpm
- Include a manual and a reversible switch

Software
- Fully Windows compliant
- Set-point remote control on control loop function
- Data can be exported in Excel for further analysis
- Graphical display
  * Online Graphic
  * History Graphic

Vessel
- 3 to 10 L single wall vessel
- Medium contacted parts are made from Stainless Steel 316
- Mirror polish head plate
- Stirrer shaft with single mechanical seal
- Head plate with maximum number of ports
- Full range of accessories

System expansion are available for

- Exhaust gas analysis
- Mass Flow control for each air
- O_2 Enrichment valve with rotameter
- On line Cell Density Monitor
- Circulating Cooling Water Bath

Air Lift Fermentor

Innovative Life Sciences Tools

The Air Lift Fermentor is specially designed for biomaterial requiring air mixing method. This laboratory scale system offers two vessel choices and accessories for a wide range of cell culture. It is ideal for research, educational and industrial applications.
This system is offered in a complete package, including all the associated instruments and accessories

Feature

- Efficient, low shear mixing
- Efficient gas exchange
- 3 type of control unit canbe chosen, which from full to classic function

Air Lift Fermentor

MS-L Series

Application :

To culture some cell lines are so fragile and will be easily shear by any type of mechanical impeller, for example fungi.

Vessel Specification

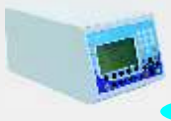
Vessel Type	Jacket Vessel	Single Wall
Total/Maxi. Working Volume	6.6 L / 5.28 L	
Inner Dimension	∅ 130 x L 500 mm	
Draft Tube	Adjustable	
Sparger	Micro-sparger	
Material Glass	Borosilicate Glass	
Head Plate and all Fittings	Stainless Steel 316L	
Port arrangement on the Head Plate	- 1 ea for pH probe - 1 ea for temperature probe - 1 ea for nutrient; medium or other reagent feeding - 1 ea for inoculation - 1 ea for air out - 1 ea for sampling	
Temperature Control	Yes	No
Accessories	- 1 ea for Stainless Condenser - 1 ea for autoclavable pH probe (425 mm) - 1 ea for Stainless Steel Temperature Pocket - 1 ea for PT 100 Temperature Probe - 1 ea for Loading Tube - 1 ea for Sampling Tube	

Air Lift Fermentor

MS-L-F Included temperature control

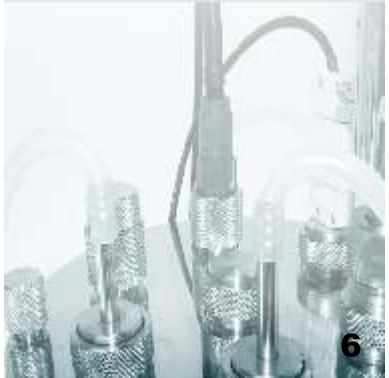
MS-L-C without temperature control

MS-L-S without temperature control

	 MS-L-F	 MS-L-C	 MS-L-S
Temperature controller	Yes	NO	
Aeration	Built in air diaphragm pump		Option for an external air diaphragm pump
Inlet gas flow meter	Adjustable 10L /min		
Outlet gas	Stainless steel condenser		
Temperature controller	15 steps programmable PID controller	NO	
Temperature control system	Choice of thermostat and dry heating system **Thermostat system** (for jacket vessel): * Heating exchanger built in 400 W heater and circulation pump * Automatic controller cooling water valve *Temperature range 8℃ above cooling water up to 60℃ **Dry heating system** (for single wall vessel): * Plug connector for bottom heating unit * Automatic controlled cooling water valve for cooling coil * Temperature up to 90℃	NO	NO
Temperature probe	Pt 100 ; 0~90℃ ; ±0.1℃		
pH probe	Autoclavable; pH 2~12 ; ±0.01; Length : 425 mm		
DO probe	Autoclavable, 0~100% ; Length : 425 mm		
Antifoam probe	316 stainless steel insulated with PTFE tube ; on/off controller		
Easy load pump	4 ea of easy load pump head ; Fifth pump for option		
	Pumps can be assigned for different functions		
	Adjustable speed ; from 0 to 100 rpm		
	15 steps programmable feeding application		
Communication port	RS 485		
Other accessories	a. 250 ml media bottle x 4 ea		
	b. 500 ml media bottle x 1 ea		
	c. 1,000 ml media bottle x 1 ea		
	d. #16 silicon tube (25 ft/pk) x 2 ea		
	e. 2 ports of stainless steel stopper x 1 ea		
	f. Stainless steel stopper x 2 ea		
	g. Stainless steel feeding tube x 10 ea		

System expansion are available for

- Exhaust gas analysis
- Mass Flow control for each air
- O_2 Enrichment valve with rotameter
- On line Cell Density Monitor
- Circulating Cooling Water Bath
- Air Diaphragm Pump



Photosynthesis Fermentor

Innovative Life Sciences Tools

Scaleable cultivation of cell and tissue suspension cultures derived from marine macroalgae requires a special type of bioreactor called a photobioreactor.
The photobioreactor is designed to provide optimal illumination, mixing, CO2 mass transfer, and nutrients to the phototrophic liquid suspension.

Feature

- Efficient, low shear mixing
- Efficient gas exchange
- For Photosynthesis Application
  - Efficient illumination
- - Large illuminated surface for max. illumination efficiency
- - Preventing of fouling via high re-circulation rates

Photosynthesis Fermentor

MS-LP Series

Photosynthesis System

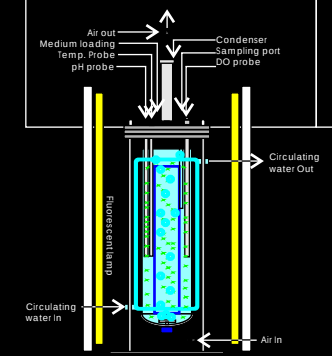
Application :

Photosynthesis is defined as the conversion of light energy into chemical energy by living organisms. It is affected mainly by light intensity and is divided into:
Oxygenic photosynthesis accomplished by:
- Plants
- Algae
- Cyano bacteria (blue-green algae)

An oxygenic photosynthesis accomplished by:
-Bacteria (e.g. purple bacteria)

Vessel Specification

Vessel Type	Jacket Vessel	Single Wall
Total/Maxi. Working Volume	6.6 L / 5.28 L	
Inner Dimension	∅ 130 x L 500 mm	
Draft Tube	Adjustable	
Sparger	Micro-sparger	
Material Glass	Borosilicate Glass	
Head Plate and all Fittings	Stainless Steel 316L	
Port arrangement on the Head Plate	- 1 ea for pH probe - 1 ea for temperature probe - 1 ea for nutrient; medium or other reagent feeding - 1 ea for inoculation - 1 ea for air out - 1 ea for sampling	
Temperature Control	Yes	No
Accessories	- 1 ea for Stainless Condenser - 1 ea for autoclavable pH probe (425 mm) - 1 ea for Stainless Steel Temperature Pocket - 1 ea for PT 100 Temperature Probe - 1 ea for Loading Tube - 1 ea for Sampling Tube	

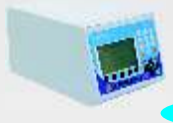


Photosynthesis Fermentor

MS-LP-F Included temperature control

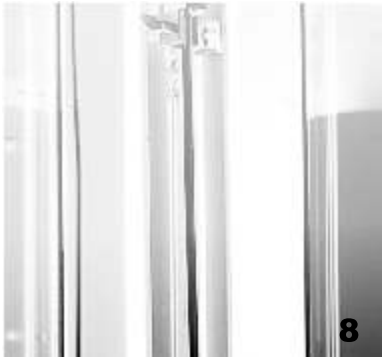
MS-LP-C without temperature control

MS-LP-S without temperature control

	 MS-LP-F	 MS-LP-C	 MS-LP-S
Temperature controller	Yes	NO	
Aeration	Built in air diaphragm pump		Option for an external air diaphragm pump
Outlet gas	Stainless steel condenser		
Inlet gas flow meter	Adjustable rotameter; maxi. 10L /min		
Co_2 flow meter	a. Adjustable rotameter; maxi. 850 cc /min b. Selected control by -To depend on pH value - According to the fluorescent lamp on/off tim - Manual On		
Fluorescent Lamp on/off control	a. Included 4 set of T5 fluorescent lamp b. Time on/off control (24 hr)		
Temperature controller	PID control; one setting point or 15 steps programmable	NO	
Temperature control system	Choice of thermostat and dry heating system **Thermostat system** (for jacket vessel): * Heating exchanger built in 400 W heater and circulation pump * Automatic controller cooling water valve *Temperature range 8℃ above cooling water up to 60℃ **Dry heating system** (for single wall vessel): * Plug connector for bottom heating unit * Automatic controlled cooling water valve for cooling coil * Temperature up to 90℃	NO	NO
Temperature probe	Pt 100 ; 0~90℃ ;±0.1℃		
pH probe and control	a. Autoclavable; pH 2~12 ; ±0.01; Length : 425 mm b.It can be chosen by : - control by CO_2 air - control by adding reagent		
Antifoam probe	316 stainless steel insulated with PTFE tube ; on/off controller		NO
Easy load pump	4 ea of easy load pump head ; Fifth pump for option		NO
	Pumps can be assigned for different functions		NO
	Adjustable speed ; from 0 to 100 rpm		NO
	15 steps programmable feeding application		NO
Communication port	RS 485		
Other accessories	a. 250 ml media bottle x 4 ea		
	b. 500 ml media bottle x 1 ea		
	c. 1,000 ml media bottle x 1 ea		
	d. #16 silicon tube (25 ft/pk) x 2 ea		
	e. 2 ports of stainless steel stopper x 1 ea		
	f. Stainless steel stopper x 2 ea		
	g. Stainless steel feeding tube x 10 ea		

System expansion are available for

- Exhaust gas analysis
- Mass Flow control for each air
- O_2 Enrichment valve with rotameter
- On line Cell Density Monitor
- Circulating Cooling Water Bath
- Air Diaphragm Pump



Classic Fermentor

Innovative Life Sciences Tools

The Classic Fermentor is designed as a compact, and economic, autoclavable laboratory fermentation system. For less complex culture requirement, this system is a good choice with the configuration flexibility.

Feature :

- To Choose required parts
- Easy Operated control panel
- Powerful control system
  - Cascade function to maintain DO setpoint
  - pH state function
- Wide range of autoclavable vessels
- Fully complete accessories package
- System expansion are available for
  - Exhaust gas analysis
  - Mass Flow meter for each air
  - On line Cell Density Monitor
  - O_2 Enrichment valve with rotameter

Classic Fermentor

MS-C Series

Application :

This is a economical system. There are some optional items can be chosen to meet minimal culture requirement. It is for cultivation of plant ; insect cells and microbia.

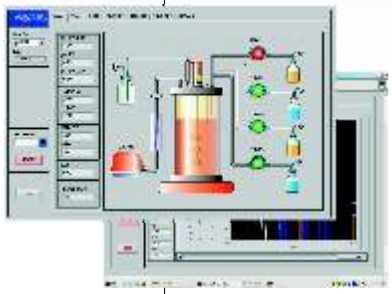
Basic control unit and Vessel Specification

Vessel type	Single Wall Vessel			
Vessel working volume	3L	5L	7L	10L
Height / diameter	260/130mm	320/160 mm	360/180 mm	400/200 mm
Outlet gas	Stainless steel condenser			
Mechanical seal	Single mechanical seal			
Driver	Removable top driver "Brush-less" motor ;			
Agitation speed	100~1,200 rpm			
Temperature probe and monitor	Pt 100 ; 0~90°C ; ±0.1°C			
pH monitor	pH 2~12 ; ±0.01			
DO monitor	0~100%			
Antifoam transmitter	on/off controller			
Communication port	RS 485			
Other accessories	a. 250 ml media bottle x 4 ea			
	b. 500 ml media bottle x 1 ea			
	c. 1,000 ml media bottle x 1 ea			
	d. #16 silicon tube (25 ft/pk) x 2 ea			
	e. 2 ports of stainless steel stopper x 1 ea			
	f. Stainless steel stopper x 2 ea			
	g. Stainless steel feeding tube x 10 ea			

Standard Included

- Control Unit :
  - Standard system included transmitters for pH; DO; Temperature; anti-foam
  - Agitation motor and driver also included
  - Digital monitor for pH; DO; temperature; agitation
  - Calibration function for pH; DO
  - Control function
    * Manual mode
    * DO cascade stage to response for agitation, substrate feeding

- Agitation (standard)
  - Top driving motor
  - Maintenance free Brushless motor
  - Speed range is from 100 to 1,200 rpm
- Vessel (Standard)
  - This system is suitable for 3 to 10 L single wall vessel
  - Medium contacted parts are made from Stainless Steel 316
  - Mirror Polish head plate
  - Stirrer shaft with single mechanical seal
  - Head plate with maximum number of ports
  - Full range of accessories



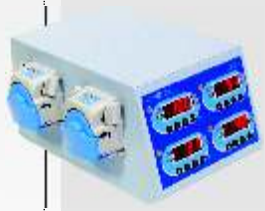
- Software (Standard)
  - Fully Windows compliant
  - Set-point remote control on control loop function
  - Data can be exported in Excel for further analysis
  - Graphical display
    * Online Graphic
    * History Graphic

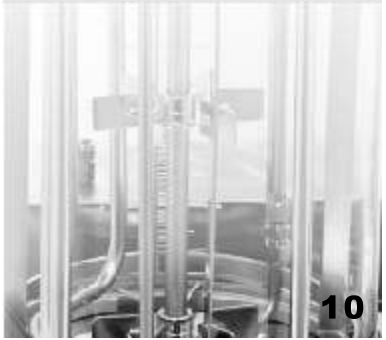
Optional items

- Bottom heating Temperature Control System
  - Fermentor base unit built in the heating material
  - Automatic controlled cooling water valve for cooling
  - Temperature controlled from 0 to 90℃
- Peristaltic pump station
  - 2 or 4 sets of peristaltic pump
  - Easy tube load pump head
  - Driving via stepping motor
  - Accurate rpm control, even on 1 rpm
  - Include a manual and a clockwise & anti clockwise switch
- Air Flow Control Station (optional item)
  - Adjustable precision rotameter
  - External air diaphragm pump
- Autoclavable pH probe;
- Autoclavable DO probe
- Autoclavable anti-foam probe

System expansion are available for

- Exhaust gas analysis
- Mass Flow control for each air
- O_2 Enrichment valve with rotameter
- On line Cell Density Monitor
- Circulating Cooling Water Bath





MS-FM

Application

To monitor pH; DO; temperature on fermentation or other research.
To connect a peristaltic pump, it will be a pH and substrate feeding controller.

Temperature probe and monitor	Pt 100 ; 0~90°C ;± 0.1°C
pH monitor	pH 2~12 ; ±0.01
DO monitor	0~100%
Antifoam transmitter	on/off controller
Communication port	RS 485

- Feeding Substrate control

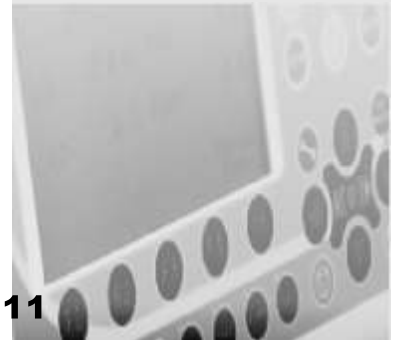
- pH monitor

- DO monitor

- pH control

- DO control to response for feeding substrate

- pH monitor &control
- DO monitor
- DO control to response for feeding substrate
- Feeding substrate control



Digital Peristaltic Pump

Digital and Precise Control




	MU-D01	MU-D01	MFU-01	MFU-02
Control	Digital type	Digital type	Digital type; individual controller for each pump	Digital type; individual controller for each pump
rpm	20 ~ 300	5 ~ 600	1 ~ 100	1 ~ 100
Increasing	1 rpm	1 rpm	1 rpm	1 rpm
Motor	Brush-less motor	Brush-less motor	Stepping motor	Stepping motor
Number of roller	3	3	3	3
Number of pump head	1	1	2	4
Stacking number of pump head	Maxi. 2	Maxi. 2	Maxi. 2	Maxi. 2

Feature:

- Compact size
- Digital precise control
- Easy load pump head
- Wide application
- Reversible for purging

Silicon Tube and Typical Rate

Silicon Tubing Cat. No.	Tube I.D. Size(")	10 rpm (ml/Rev)	200 rpm (ml/Rev)	400 rpm (ml/Rev)
MU-S13	1/32	0.6	12	24
MU-S14	1/16	2.1	42	84
MU-S16	1/8	8	160	320
MU-S17	1/4	28	560	1120
MU-S18	3/8	38	760	1520
MU-S25	3/16	17	340	680

MS-GAS-01

Application:
- For Monitoring & Control of O_2 & CO_2 Gasses in Fermentation Research
- On-line physiological state measurement
- Scale-up and scale-down predictions
- Batch variation studies: feature analysis
- Metabolic flux analysis and mass-balance calculations

FEATURES AND BENEFITS
- Suitable for fermentor from any brand
- Sensors are maintenance free, provide high accuracy and excellent long-term stability
- Built-In flow meter enables precise control of the sample gas flow rate
- Simultaneous Export of Data to a PC enables automated process control
- The standard data logging software is included

Specification

	Carbon Dioxide	Oxygen
Sensor	Infra Red Absorption	Electrochemical
Range	0 ~ 5 %	0 ~ 30 %
Resolution	0.01 %	0.01 %
Accuracy	0.02 %	0.02 %
Drift	< 5 % / Month full scale	0
Temperature Compensation	Included	0.02 % / C
Gas Flow Rate	0.1 ~ 1.0 L / min	
Maxi. Operation Pressure	3 bar	
Calibration	Standard 2 point calibration on existing instrumentation	

Cell Density Monitor and Sensor

The Cell Density Transmitter is a remote, pipe or panel mounted, instrument which has been designed to optimize the performance and reliability of the Cell Density Sensor by enabling automatic zeroing, temperature compensation, diagnostics, curve fitting and verification.

Feature

- Low cost solution
- Remote mounted (pipe or panel)
- Automated zeroing, curve fitting and
- temperature compensation
- Enable sensor swapping
- Four point verification procedure

Physical Description

Case Material	ABS
Rating	NEMA 4X
Dimensions	157 x 157 x 103 mm
Mounting	Remote, panel or pipe mounted
Conduit Openings	Accepts Pg 13.5 conduit fittings
Display	Four line 20 character display ; Charactor height of 4.8 mm

Specifications

Output	Isolated 4~20 mA
Analog output signal	Two wire, 4~20 mA output; Fully scalable over sensor range
Output accuracy	+/- 0.05 mA
Optical loss range	0 ~ 4.00 AU
Accuracy	+/- 0.005 AU at 25 C
Repeatability	+/- 0.001 AU at 25 C
Diagnostics	The internal diagnostics can detect : laser failure, 4 to 20 mA loop errors, or zeroing errors
Calibration	For each probe, the transmitter generates the calibration constants from a user-entered key
Validation	A manual four-point validation procedure is made using NIST-traceable optical filters
Temperature compensation	Automatic compensation covers the range 15 to 45 C. Manual compensation is not selectable

The Cell Density Monitor is an optical sensor solution consisting of an optical probe and a transmitter having a dedicated 4 to 20 mA output. The optical probe consists of a VCSEL laser, a molded optical gap, and a silicon photodetector with an integral ambient light filter for higher accuracy. All wetted materials of the probe are USP class VI compliant. The design of this sensor has been optimized to provide accurate in-situ measurement of cell count in real time for both cell culture and fermentation applications.

Feature

- Low cost solution
- 12 mm sensor w/USP class VI wetted materials
- Suitable for cell culture and fermentation
- 50+ autoclave cycles at 134 C for 45 minutes
- Remote transmitter

Optical Performance

Range	0 ~ 4.0 AU (corresponds to 0 ~ 500 OD, app. Dependent)
Precision	+/- 0.002 AU or 5% of reading, whichever is greater
Accuracy	+/- 0.005 AU or 5% of reading, whichever is greater
Drift	< 0.02 AU over any 10 C range
Readout Resolution	0.001 AU

Sensor

Measurement Wavelength	850 nm
Light Source	Vertical Cavity Surface-Emitting Laser
Optical Path Length	5 mm and 10 mm
Probe Diameter	12 mm
Insertion Lengths	120, 225, 325 and 425 mm
Wetted Materials	FDA-approved PFA and 316L stainless steel
Surface Finish	RA 12 electro-polished (less than 0.40 micron surface finish)

pH and DO Sensor

Innovative Life Sciences Tools

pH Electrodes

Feature

- Fast response
- Highly repeatable
- Proven reliability
- Suitable for autoclave, SIP and CIP
- Certified “Like for Like”
- replacement for Broadley-James
- and Mettler-Toledo

The TrupH family of 12mm pH electrodes is designed for improved performance, better repeatability and increased reliability in bioprocess applications such as Cell Culture and Fermentation.

Specification

pH	0 ~ 14 (2 ~ 12 for maxinum precision)
Temperature	0 ~ 135℃
Pressure	6 bar maxinum
Connection	Pg 13.5
Temperature Compensation	Integral Pt100 (VP model)

Electrodes Cat. Number

Length	S8	K8	VP (Pt 100)
120 mm	MF-PF-S8-120	MF-PF-K8-120	MF-PF-VP-120
225 mm	MF-PF-S8-225	MF-PF-K8-225	MF-PF-VP-225
325 mm	MF-PF-S8-325	MF-PF-K8-325	MF-PF-VP-325
425 mm	MF-PF-S8-425	MF-PF-K8-425	MF-PF-VP-425

Cables Cat. Number

Length	S8	K8	VP (Pt 100)
2 m	MF-CAB-S8-06	MF-CAB-K8-06	MF-CAB-VP-06
10 m	MF-CAB-S8-10	MF-CAB-K8-10	MF-CAB-VP-10

DO Electrodes

Features

- Fast response
- Highly repeatable
- Proven reliability
- Suitable for autoclave, SIP and CIP
- Certified “Like for Like”
- replacement for Broadley-James
- and Mettler-Toledo

The TruDO family of rebuildable dissolved oxygen sensors is designed for superior performance, greater repeatability and improved reliability in bioprocess applications such as cell culture and fermentation.

Specification

Measurement	Polarographic
Dissolved Oxygen	0.1 ~ 200% air saturation; 10 ppb to saturation
Temperature	0 ~ 135℃
Pressure	4 bar maxinum
Temperature Compensation	22 kohm thermistor
Wetted Material	316 S.S.
Surface Finish	Ra 12 (electro-polish)

Electrodes Cat. Number

Length	D4/T82	VP
120 mm	MF-DO-D4-120	MF-DO-VP-120
225 mm	MF-DO-D4-225	MF-DO-VP-225
325 mm	MF-DO-D4-325	MF-DO-VP-325
425 mm	MF-DO-D4-425	MF-DO-VP-425

Cables Cat. Number

Length	D4/T82	VP
2 m	MF-CAB-D4-06	MF-CAB-VP-06
10 m	MF-CAB-D4-10	MF-CAB-VP-10

Innovative Life Sciences Tools

PRODUCT

- Power Supply
- Electrophoresis System
- Gel Documentation System
- Thermoblock Reactor
- Stirring Water Bath
- MS Shaker
- MS Incubator
- MS Peristaltic Pump
- Fermentation & Cell Cultivation Technology

CCD Gel documentation System

NEW

Power Supply

Electrophoresis System

Thermoblock Reactor

MS Peristaltic Pump

Ms Incubator

Stirring Water Bath

Fermentation & Cell Cultivation Technology

MS Shaker

Gel Documentation System

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