Fermenter Stainless Steel
Model: ST-FSS100L

- **Fermenter Body**
  The material of the fermenter is made by 316L Stainless Steel. The design pressure: P (inside) = 0.3Mpa, P (interlayer)=0.3Mpa, the polishing precision: Ra 0.4~0.6, the ratio between diameter and height: 1:2.5 Working volume: 70L to 72L
- **Sterilization Method**
  In-situ auto Sterilization
- **Stirring System**
  Mechanical sealing system at the top of the fermenter; high-powered stirring peddle, antifoam peddle, AC electrical parts: infinite speed variation 70~800rpm ±1%,The height of the stirring peddle can be adjusted.
- **Temperature detection and control**
  Heated by thermostatic water tank and circulate by circulating pump autocontrol (cooling water+5°C)~70°C±0.1°C) via temperature probe.
- **pH detection and control**
  2.00-12.00±0.05pH, autocontrol of adding acid and base, pH sensor with protective sheild fermenter is autocontrolled with peristaltic pump.
- **DO detection and control**
  0-150±3% displaying precision 0.1%, sensor (Mettler, Switzerland) and shielding lead (Mettler, Switzerland)
- **Feed control**
  100L fermenter uses peristaltic pump (Longer) to add meterials
- **Antifoam control**
  Antifoamer by peristaltic pump
- **Aeration detection and control**
  Manual control precision of : 0.1μ, displayed by rotameter.
- **Pressure detection and control**
  Manual control by diaphragm pump displayed by pressure gauge.
- **Tubing and valve**
  The tubing and valves which are in contact with the fluid are made by 316L stainless steel, the valves are diaphragm type.

Control System
Siemens S7-200 series PLC control system, it is a stable, universal type of PLC, to suit a variety of automation applications, especially in manufacturing process control application. Its modular, Siemens PLC controller an advanced control system, it uses the touch screen display, on-site direct operations (menu type), also with the host computer for data transmission, data sampling and display, the system view of data analysis, reading settings.10-inch LCD touch screen to display complete content, user-friendly screen is simple, easy to operate.
The control system can adapt to different range of sensors and actuators.

Software: Siemens S7+ FORCE CONTOROL
Data collection and control module: Siemens S200 PLC controller and datacollection and control module.
1. Control
   - Manual control: You can set the duration of valve opening
   - Automatic control mode: You can select continuous or PID PID control the switch
   - Sequence control: the control of all parameters can be pre-set at least 10 control section
   - Automatic segmentation remotely control: PC control
   - Acceptable correlation control: the dissolved oxygen can select speed, air flow rate, tank pressure, control of feeding, etc.; pH can choose to control with acid and alkali
2. XY-axis to chart real progress can be any expansion and contraction of graphics display, to help the operator determine the parameters of the interaction between the effects of the fermentation process to quickly modify and adjust.
3. Data Processing
   - to show that all the parameters of the trend curve analysis
   - to store, display, analyze all the historical curve parameters
   - can display all the parameters of the batch report
   - copy the data directly with the USB
   - data storage format is compatible with EXCEL.

4. Controller self-protection function: to set the password, others can not modify the fermentation parameters and the controller is not lost due to power settings for each parameter.
5. Can process control parameters, each parameter can have 10 programme.
6. Time display of each parameter recording interval can be adjusted
7. Two parameters can be carried out with the screen settings and calibration
8. Indicate the controller is fuctioning, the panel display the process stage process hardware, and motion status indicator for understanding the various devices (such as peristaltic pumps, circulating pumps, heating, mixing, etc.) work status, Fault will be displayed on the screen.
9. Each parameter of the transmission are independent modules, without disturbing each other, for easy maintenance
10. PH, DO and other parameters of control and associated controls can be adjusted. It is Version 8.0 software data recording and processing type or the fermentation purpose with operation interface, data storage and backup, curve analysis, report generation analysis, for the fermentation and production process control and data processing.

Main Features:

1. Can record the fermentation time, temperature, pH, dissolved oxygen, rotational speed, air flow, pressure, fill quantity, the amount of foam, acid dosage
2. Can controlled variable settings and parameters, remote operation
3. Can set sequence control
4. Can record off-line parameters.
5. Trend curve, historical curve shows 1-10 (any setting) curve;
   - You can select a different start time and the time period (8,24,48,72,96 and 144 hours);
   - You can set the upper and lower curves, in order to improve display resolution;
   - You can choose any of several different batches (1-10) curve also shows for comparative analysis;
   - X,Y-axis graph which can spread or diminish images help user to judge the inter-influence of parameters, so as to modify or regulate the process of fermentation.
6. Report Printing
   - can show significant 1-12 (any set) data, and print output;
   - You can select a different start time and choose different time intervals (1,5,15,30,60 minutes);
   - You can choose any of several different batches (any set) data, and print output,
   - To comparative analysis;
7. Curve printing
   - You can show the curve

   EXCEL platform can also be carried out in data processing and printing, is very convenient.

Technical Parameter

Parameter	Guideline	Controller data processing function
pH	Displaying range: 0.00 ~ 14.00±0.01 Auto Control Range: 2.00 ~ 12.00±0.05 Fermentation process control (According to the fermentation time, auto-control pH)	pH value historical and trend curve analysis Acid, alkali dosage curve analysis. Batch report form analysis. Acid, alkali total dosage record store and deliver data.
DO	0-150±3%, Displaying precision: 0.1% It can be controlled by rev and feeding. Fermentation process control (According to the fermentation time, auto- control DO fluent, at least 10 parts)	DO value historical and trend curve analysis Batch report form analysis Store and deliver data
Antifoam	Automatic PID control and alarm Fermentation process control (According to the fermentation time, auto- control antifoam)	Antifoam value historical and trend curve analysis Foam error report Antifoam total dosage record Batch report form analysis Store and deliver data
Rev	**Automatic enactment and control** **Fermentation process control** (According to the fermentation time, auto- control)	Rev value historical and trend curve analysis Batch report form analysis Store and deliver data
Temperature	**Temperature of cooling water: +5°C-70**°C **±0.1**°C **Fermentation process control** (According to the fermentation time, auto- control temperature)	Temperature value historical and trend curve analysis Batch report form analysis Store and deliver data
Feeding	**PID automatic enactment and control** **Fermentation process control** (According to the fermentation time, auto- control feeding)	Feeding value historical and trend curve analysis Batch report form analysis Feeding total dosage record Store and deliver data
Pressure	Manual control, instrument display	
Air Flux	Manual control, instrument display	