large-scale fermenter bioreactor for pharmaceutical industry

Large-scale fermenter bioreactor is widely used in many fields such as biotechnology, pharmaceutical, food, environmental protection and so on, for cell culture, microbial fermentation, enzyme reaction and other biological processes.

Large-Scale Fermenter Bioreactor

The large-scale fermenter bioreactor is designed to create a stable, precisely controlled culture environment for microorganisms or cells, optimizing growth, metabolism, and production. It is suitable for biopharmaceutical, food, biofuel, environmental, and agricultural applications.

Main Features

1. **Size & Ratio:** Diameter-to-height ratio of 1:2 to 1:3 for optimal gas exchange and mixing.
2. **Mechanical Stirring:** Stepless speed regulation (50-1000rpm), adjustable paddle height for uniform mixing.
3. **Magnetic Stirring:** Top or bottom magnetic drive avoids tank contact, reduces contamination risk.
4. **Sterilization:** Supports in-situ sterilization; glass bioreactor part can be autoclaved.

5. **Temperature Control:** Intelligent PID system, electric heating & water cooling, precise control (±0.5°C, 5°C-60°C).
6. **pH Control:** Range 2.00-12.00, automatic acid/base addition via peristaltic pump.
7. **Dissolved Oxygen Control:** DO detection and PID control, speed and air flow correlation for precision.
8. **Automatic Feeding:** Peristaltic pump for regular, quantitative addition of acid, alkali, defoamer, culture medium.
9. **Anti-Foaming:** Deformation electrode monitors foam, automatic antifoam dosing.
10. **Air Intake Control:** Manual rotor flow meter, optional automatic control.
11. **Remote Monitoring:** Dedicated software, remote computer connection for monitoring, data recording, and adjustments.

Working Principle

1. Precise control of temperature, pH, DO, stirring speed, and other parameters to promote optimal cell/microbe growth.
2. Electric heater and water cooling maintain constant temperature; pH auto-adjusted by peristaltic pump additions.
3. DO managed by controlling stirring, gas flow, and oxygen input.

4. Mechanical/magnetic stirring ensures uniform mixing and oxygen dissolution.
5. Automation and remote monitoring for easy adjustment and real-time data tracking.

Application Areas

1. **Biopharmaceuticals:** Drug production (antibiotics, vaccines, proteins).
2. **Food & Beverage:** Beer, yogurt, soy sauce, vinegar, and other fermented foods.
3. **Environmental Protection:** Wastewater and waste treatment via microbial degradation.
4. **Biofuel:** Ethanol and biodiesel production.
5. **Agriculture & Feed:** Probiotics and fermented feeds for animals.

Optional Configurations

1. Automatic gas inlet control
2. Automatic tank pressure control
3. Feed weighing system
4. Optical density (OD) detection
5. Carbon dioxide detection and control

6. ORP (redox) detection
7. Exhaust gas analysis
8. Siemens PLC automation system
9. Replaceable stirring impellers
10. Upper control computer for intuitive operation and management