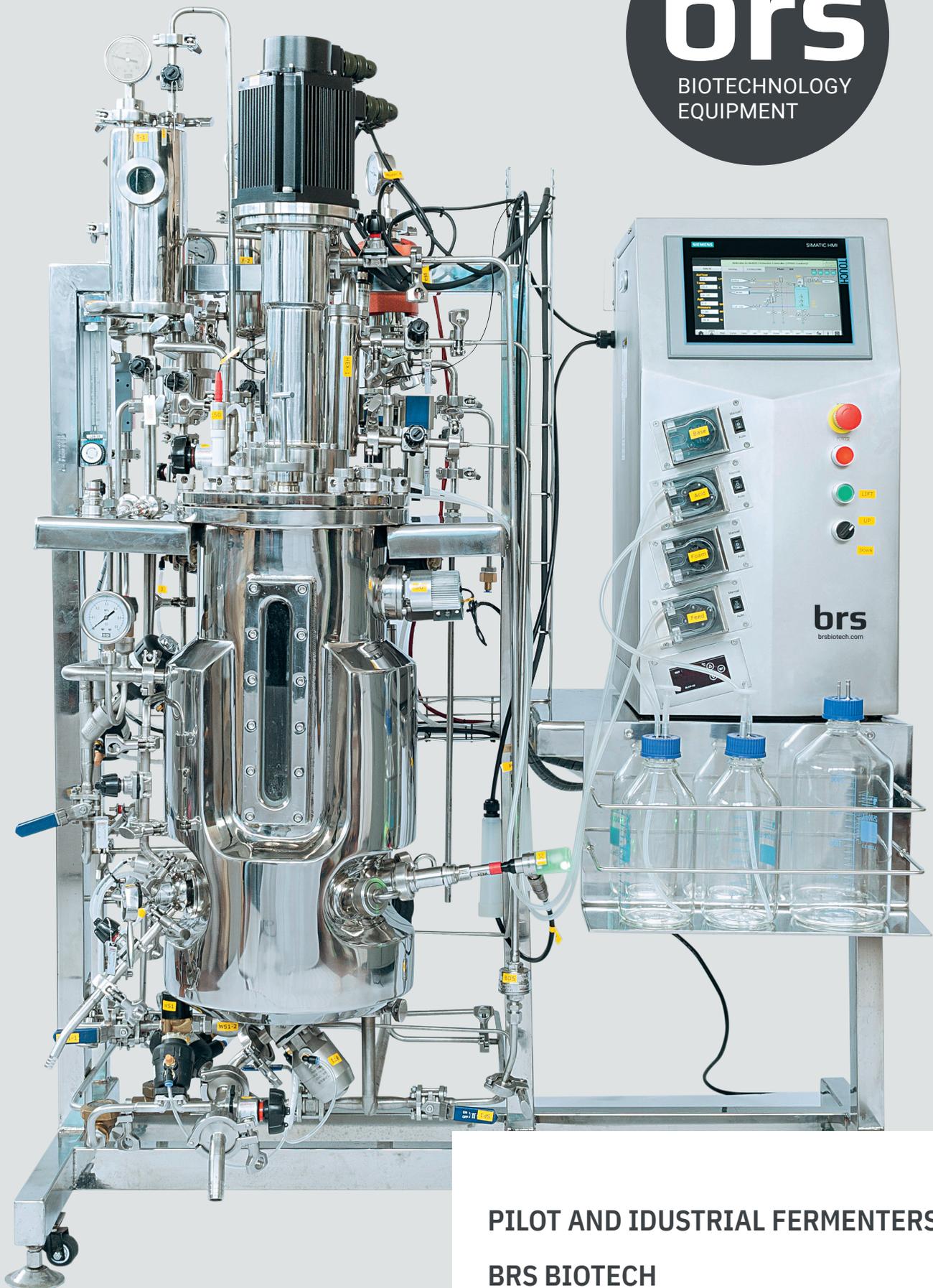


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BIOTECHNOLOGY
EQUIPMENT



PILOT AND INDUSTRIAL FERMENTERS

BRS BIOTECH



Pilot and industrial fermenters

BRS pilot and industrial scale fermenters are designed for pilot and industrial processes and industrial upscaling. We propose stand-alone units as well as fully equipped lines for biotech and pharmaceutical plants.

Features

- Volumes ranging from 15 to 15 000 l.
- Fermenter is platform-mounted. Open frame modular construction gives easy access for maintenance and operation. Central connections for steam, water and air minimize time and work requirements while starting operation.
- Power source, measurement and control tools are in separate cabinet and detached from fermenter. Each measurement and control circuit have individual module, which gives easy access for maintenance and a possibility for customization.

Application

- Pilot and industrial production of agricultural and veterinary chemicals.
- Pharmaceutical production according to GMP and FDA standards.
- Pilot and industrial production with different biotech processes – with enzymes, bacteria, fungi, algae.
- Scale-up studies, medium and process optimization for research centers.

Technical specification

Diameter height ratio: 1:3 (1:2.5, 1:2 - depends on customer requirements)

Material: Product-contact parts: stainless steel 316/Product-non-contact parts: stainless steel 304

1. Vessel

Vessel design pressure	3 bars (higher pressure upon request)
Jacket design pressure	3.5 bars (higher pressure upon request)
Operating temperature range	+ 8 °C to +60 °C, max. operating t - up to 135°C
Double jacket for automatic control of temperature	
Torospherical bottom	
Thermal insulation	
Sight glass and illumination lamp for liquid level control	
CIP spray balls	Extra option
Polishing	Ra 0.4

2. Aeration system

Rotameter	
Automatic mass flowmeter (MFC)	Extra option
Ring sparger (other spargers upon request)	
Exhaust gas heater	
Exhaust gas condenser	
Sterile inlet gas and exhaust gas filter	
Filter Integrity Control Valve	

3. Lid lifting system

Electrical lid lifting system. The lid is lifted with the agitator shaft and the drive for fermenters less than 1000 liters (Extra option)

4. Agitation

Agitation speed 40-800 rpm (depends on fermenter volume)

Frequency converter

Single mechanical seal

Double mechanical seal and magnetic seal Extra option

Mechanical defoaming blade on the shaft

Height-adjusting agitator impellers, impeller type- Rushton
(or marine impeller, pitched blade or the customized impeller)

Bumper

5. Temperature control

Fully automatic sterilization full and empty vessel

Adjustable sterilization temperature and time

Electrical heating for temperature maintaining during fermentation

Indirect heating through a heat carrier

Temperature sensor, valves, heat exchanger, circulation pump, PID control

6. Defoaming control

Defoaming sensor

Peristaltic pump for defoaming solution dosing

Mechanical defoaming blade on the shaft

7. PH control

Sterilizable digital PH sensor 2.00~12.00 ± 0.05, 0~14.00

Range of display and automatic adjustment (depends on the sensor)

1 peristaltic pump for acid addition, 1 peristaltic pump for alcali addition, automatic mode of maintaining of the set pH level

pH control via CO2 supply Extra option

8. DO control

Sterilizable digital optical DO sensor 0-100±3%

Range of display of DO sensor

a) A cascade automatic control through change of stirrer speed
(available with rotameter, included in a standard configuration)

b) A cascade automatic control through change of stirrer speed, air flow and pressure in the vessel
(available in case of MFC purchase)

9. Pressure measurement and control

Pressure sensor

Pneumatic pressure control valve

Safety valve on fermenter head plate and jacket

10. Peristaltic pumps

4 peristaltic pumps Watson Marlow with fixed speed in total:

Alkali pump

Acid pump

Defoaming pump

Feeding pump

Extra pumps with fixed speed and variable speed are available as Extra option

11. Sampling system

Sterilizable-in-place sampling valve type

12. Ports (design according to the customer requirements)

Temperature sensor port

pH sensor port

pO2 sensor port

Defoaming sensor port

CIP spray balls port (in case of installation)

Feeding port – 4 needles ports

Spare port (upon customer request)

Inoculation port

Port for safety valve on the lid

Port for safety valve on the circulation circuit (jacket)

Exhaust gas port

Pressure gauge port

Sampling valve port

Air sparger port

The number and configuration of ports depend on the selected options

13. Main functions of basic control program BRS B

- 3 different access levels
- Parameters settings
- Status display of each actuator (valves, circulation pump, flowmeters, etc.)
- Pressure setup
- Temperature trend display
- pH, DO, agitator speed, gas supply flow rate (depending on the number of flow meters) trend display and data excel table
- Sterilization setup
- Remote operator's workstation with a personal computer (extra option)
- DO cascade control setting
- Setting and control of agitator speed
- Setting and control of gas supply rate
- Warning and alarm settings and messages record
- Fermentation sequences
- Data exportation via USB or CD card (Data on the main parameters) in Excel compatible format
- Calibration

the number of functions in the program) depend on the configuration of the fermenter

Extra options

No	Options
1.	Double mechanical seal
2.	Magnetic seal – depends on the fermenter volume
3.	CIP spray balls
4.	Lid Lifting System (up to 1000 liters)
5.	N2 rotameter with gas supply line
6.	O2 rotameter with gas supply line
7.	CO2 rotameter with gas supply line
8.	Air automatic mass flowmeter (MFC)
9.	N2 automatic mass flowmeter (MFC)
10.	O2 automatic mass flowmeter (MFC)
11.	CO2 automatic mass flowmeter (MFC)
12.	Replacement fixed speed pumps with variable speed pumps
13.	Overlay gas supply
14.	Extra pump with fixed speed
15.	Extra pump with variable speed
16.	Additional impeller package (types of impellers depend on customer requirements)
17.	Additional system for injecting media into the vessel through sterilizable-in-place ports
18.	pH control via CO2 supply
19.	Redox sensor
20.	Exhaust gas analyser of CO2
21.	Vessel weight measurement – level control
22.	Scale for nutrient weight
23.	Optical density sensor
24.	Living cell concentration monitoring sensor Hamilton
25.	Remote operator's workstation with a personal computer

Other options upon customer request

Turnkey projects

We propose stand-alone units as well as fully equipped lines for biotech and pharmaceutical plants, designed and completed according to customer requirements



We produce also these types of fermenters:



Photobioreactors



Solid-phase fermenters



Airlift fermenters

Fermentors& Bioreactors/Downstream Processing Equipment

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