

Kuhner shaker

SB200-X (OrbShake)

Orbital shaken bioreactor
for disposable bags





The SB200-X is a shaken bioreactor system for the cultivation of human, mammalian and plant cells in a disposable bag. This user friendly system with a working volume from 50 litres up to 200 litres can be easily deployed in production.

Performance characteristics

- + Large capacity (200L working volume) single use bioreactor system
- + Cultivation of human, mammalian and plant cells
- + Fast, simple set up
- + Easy scale-up
- + Online measurement of pH and DO

Disposable bag for a fast and simple set up

The use of disposable bags eliminates elaborate cleaning and sterilizing procedures and ensures quick set up times. The bag for the Kuhner shaken bioreactor is less complicated and therefore less expensive than others because no additional mixing device is required (e.g. stirrer, ...). This also reduces the risk of mechanical damage, improving process security.

Orbital motion

The orbital motion of the SB200-X ensures efficient liquid mixing. It allows high oxygen transfer rates with low shear forces. Mechanical stress on the cells is reduced thanks to bubble-free surface gassing with almost no frothing. Furthermore, the orbital motion is suitable for cultivations with microcarriers.

Trouble free scale-up

Another advantage of the SB200-X is easy scale-up from microtiter plates all the way up to 200 litres. The reason for this lies in the consistent hydro-dynamics of shaken bioreactors. The SB200-X uses the unique Kuhner direct drive which provides accurate control of the orbital speed. The machine's mechanical design has a proven history of reliability.

Control unit and process safety

The SB200-X can be heated or cooled. Temperature ramps are easily programmed and processed. Duplex online measurement of each parameter (dissolved oxygen and pH value) is available ensuring greater process safety.

The Kuhner designed control unit features the latest generation touch screen technology and ISIS 8.0 software for data recording.

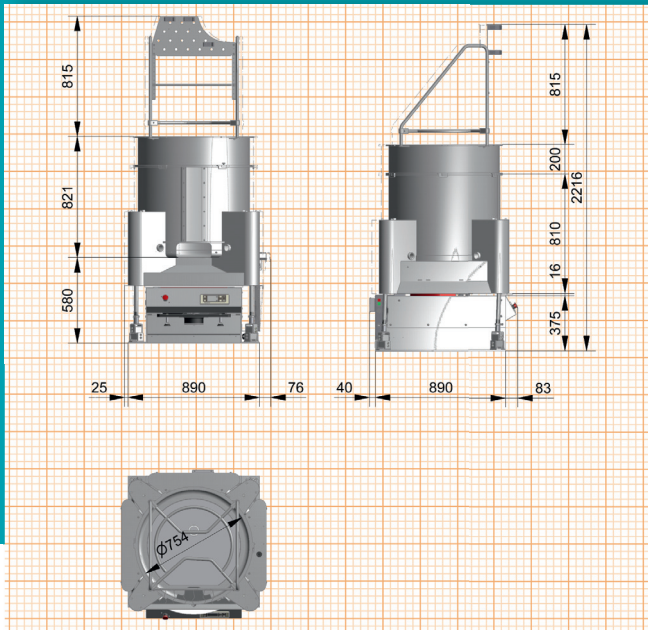
The SB200-X was developed and tested in collaboration with ExcellGene SA (Monthey, Switzerland) and the Swiss Federal Institutes of Technology EPFL (Lausanne, Switzerland).

Gas mixing

The SB200-X has an integrated gas mixing device (FlowCon).

Whether stabilizing the pH with CO₂, or preventing low dissolved oxygen concentrations, the FlowCon gas mixer meets all user needs. Four mass flow controllers ensure highly accurate and reproducible gas mixing. An integrated pressure sensor prevents over pressure in the bioreactor by reducing the gas flow in the first step and shutting off the gas flow in the second step. Step limits can be freely programmed by the user. Integrated air filters and back pressure valves ensure interference free and long operating times for the FlowCon. The Kuhner ISIS-Software provides data logging, programming, controlling and calibration. Technical controls for "21 CFR Part 11" compliance are built in to ISIS-X software.

Dimensions



Technical data

● Technical data	SMX200E
Bag	SMX2010
Shaker speed	max. 80 rpm
Shaker diameter	50 mm (orbital motion)
Weight	approx. 350 kg without liquid
Accuracy, absolute	0.1 rpm
Setting, digital	1 rpm
Active brake	adjustable
Interface	CAN-Bus, RS232
Temperature	up to 50°C
Cooling	cooling coils are incorporated for connection to an external cooling system (pressure <0.2bar)
● Oxygen Sensor	Optical measuring method
Range	0-100%
Accuracy	± 0.01%O ₂ at 0.21%O ₂ ± 0.1%O ₂ at 20.9%O ₂
Drift	< 0.015%O ₂ per day
Temperature range	up to 50°C
● pH Sensor	
Range	5.5 – 8.5
Accuracy	± 0.05 pH at pH 7 with one point calibration ± 0.10 pH at pH 7 with pre calibration
Drift	< 0.005 pH per day
Temperature range	up to 50°C
● Mains connection	
SMX1021:	220 - 240 V / 50-60 Hz
SMX1022:	190 - 210 V / 50-60 Hz
SMX1023:	110 - 120 V / 50-60 Hz
SMX1024:	95 - 105 V / 50-60 Hz

• ISIS-Software	for monitoring, calibration, controlling
Monitoring	O ₂ , pH, shaking speed, temperature
Calibration	pre-calibrated sensors in bag
Recalibration	one point recalibration is possible
Applicable	98/NT/2000/XP/Vista/Win7
GMP	21 CFR Part 11 compliance (audit trail)

• FlowCon 4 (integrated)	
Number of mass flow controllers	up to 4
Ambient conditions	5-40 [°C], max. 85 [%rH]
Input	up to 4 gases, push in connector 6 mm (air, oxygen, nitrogen, carbon dioxide) (also gas mixtures can be connected)
Input pressure	1-2 bar
Output	1, (tube fitting for tube ID 13 mm)
Flow rate	0.0 - 20.0 [sL/min]
Accuracy	±1.5% from the end value
Pressure sensor	integrated, 0-400 mbar, programmable prevents over pressure in the connected vessel
Air filter	integrated, prevents blocking the mass flow controllers
Back pressure valve	integrated, prevents reflux into the mass flow controllers
Controlled filter heating box	for the outlet filters, prevents blocking of the filters caused by condensation (only air inlet and outlet with silicon tubing)
C-Flex material	for the tubing enables the user to connect additional components via tube welding



Accessories

Disposable bag

Order number: SMX2010

The use of disposable bags eliminates elaborate cleaning and sterilising procedures and ensures quick set up times.

The bag for the Kuhner shaken bioreactor is less complicated and therefore less expensive than others because no additional mixing device is required (e.g. stirrer, ...). This also reduces the risk of mechanical damage, improving process security.

The single-use bag has a working volume from 50 litres up to 200 litres. Various ports are available for feeding, inoculation, harvesting and sampling. The bag also incorporates sterilized sensors for pH and DO.

The bag has a three layer composition. Low density Polyethylene (LDPE) for the external protective layer, Ethyl vinyl alcohol (EVOH) as the middle layer to decrease gas transmission and Ethylene vinyl acetate (EVA) that provides a clean, inert and highly chemical resistant contact layer.

ISIS-Software

Kuhner developed the user-friendly ISIS-Software for supervision, monitoring, and recording of data. The software is easy to operate.

Interfaces

Kuhner shakers are equipped with a CAN-bus. CAN-USB, CAN-Ethernet, EMI-60 and NET-60 are all well established interfaces.



Options

Cooling

The SB200-X has a cooling ring embedded in the base plate and cooling is achieved by connecting an external cooling device. An integrated valve, controlled by the ISIS-Software, regulates the set point temperature.

IQ-OQ Documentation

IQ-OQ (Installation Qualification and Operation Qualification) is an equipment qualification required for GMP procedures. This service is available from Kuhner and can also be carried out at the customer's premises.



Shakers & Accessories

www.kuhner.com

Kuhner

Represented by:

Adolf Kühner AG • since 1949

Dinkelbergstrasse 1
CH-4127 Birsfelden (Basel)
Switzerland

phone +41 (0) 61 319 93 93
fax +41 (0) 61 319 93 94
office@kuhner.com

www.kuhner.com