Kuhner shaker

www.kuhner.com

The world’s most reliable shaking machines

Kuhner shaker

From bench top shakers to large industrial shakers, Kuhner AG manufactures high quality machines for customers around the world.

www.kuhner.com

Kuhner shaker • since 1949

Our motto: To build the world’s most reliable shakers

Kuhner AG is the leading developer and manufacturer of shaking machines for the international market. Founded in 1949 by Mr Adolf Kühner, this family business is now led by his son Markus Kühner.

The «Kuhner shaker» name stands for functionality, reliability and durability. Kuhner guarantees its machines for 5 years, designing and building many components in-house. All processes are SN EN ISO 9001 certified.

We endeavour to understand your science and cultivation needs to ensure solutions that accelerate your time to market and elevate your results. We commit to earning the trust of our clients and establishing relationships which will span decades. Kuhner fosters close contact with research and development departments in notable universities and companies. We constantly investigate new developments looking for opportunities to further optimise the design and performance of our shakers.

Kuhner offers a personal service for customers including product information, support and on-site visits.

ISO 9001 BUREAU VERITAS Certification

Shaking solutions for research and production

5 YEAR

5 Year Warranty

Incubator Shakers

Available with controlled CO_2 & humidity

Kuhner Kelvin+

LT-X

ISF1-Z

ISF4-X

Lab-Shaker

Continuous, maintenance-free operation

LS-Z

Pilot-Shakers

Orbital shaking

RC2-X

SR200-X

Rack System

Adaptable and extendable

SBM/SS-X

Orbital shaken bioreactors (OSB)

Easy scale-up

SB10-X

SB50-X

SB200-X

SB2500-Z

Only Kuhner can provide multiple shaking diameters in a single shaker.

Direct drive

- Low energy consumption
- Smooth running and quiet operation
- Option of 3 direct drives:
  Standard, high speed, high power

Changeable diameter

Diameter can be adjusted by the user at any time

- Three standard shaking diameters:
  12.5 mm, 25 mm and 50 mm
- Other shaking diameters are also possible:
  e.g. 70 mm for liquids with high viscosity

  Z-drive: 3/6/9/12.5/19/25/50/70 mm
- Option 3 mm/1000 rpm

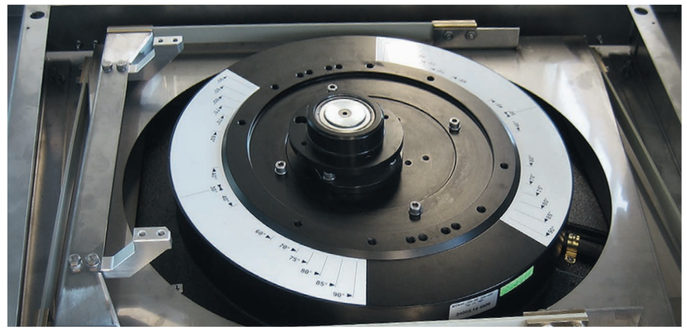
3mm/ 1000rpm

New Option

3 mm/1000 rpm including all standard shaking diameter in one machine

Parallelogram

The parallelogram ensures identical shaking movement anywhere on the tray, regardless of load distribution. The double steel springs will last a lifetime.



ShakerControl

Foamed insulation

The key to our precise KuhnerControl is the unique insulation process with CFC-free foam.

Foaming is done by hand to ensure:
- Precise control of process parameters
- No condensation between insulation and casing
- Reduced energy consumption
- Silent operation

Silent operation

Temperature control

Homogeneous temperature distribution across the entire shaking tray of a Kuhner incubator shaker ensures reproducible cultivation results. Precise temperature control with low energy consumption is guaranteed.

CO_2 control

Reliable control of CO_2 is essential when working with mammalian or plant cell cultures and also with algae. A CO_2 controlled atmosphere inside the shaker incubator allows exact pH adjustment of the culture medium. Kuhner was the first company to manufacture and supply shakers with CO_2 control, so you can rely on our many years of experience.

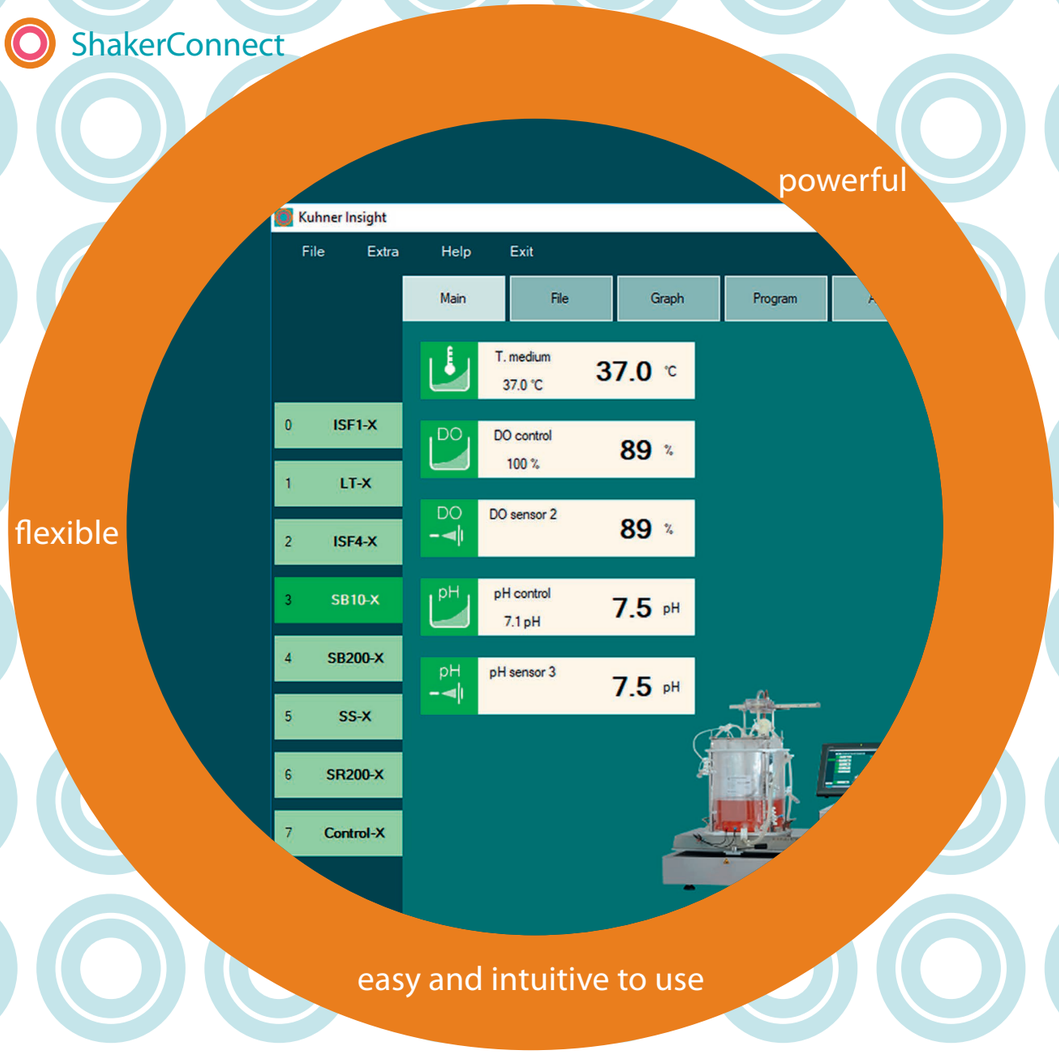
Humidity control

Controlled humidity is an important factor when working with microtiter plates, or when cultivating in flasks for long periods (e.g. cell cultures), as humidity can significantly reduce evaporation. Heated windows and door frames prevent condensation.

Control

Kuhner shakers are characterised by their user friendly controls. Every process parameter has its own controller and navigation is extremely simple.

ShakerConnect



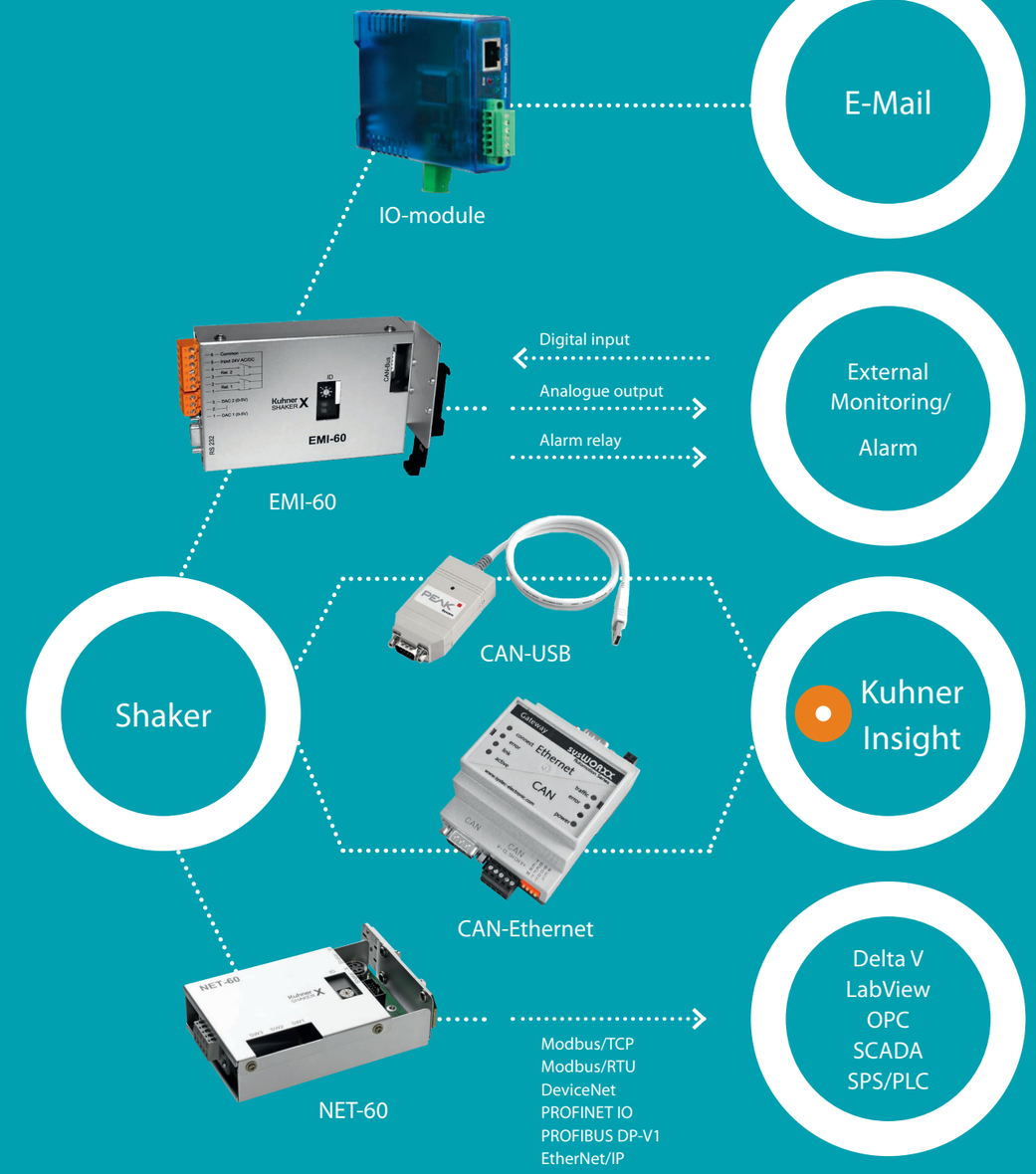
For convenient supervision of the shaker with GMP features

Kuhner Insight Software

Kuhner Insight is our user-friendly software for data recording, calibration, programming and controlling. Simultaneous recording of process parameters for up to 8 shakers is possible.

Interface

Our wide range of interfaces keep you well connected.



LT-X / LT-XC

- Used in biotechnology and pharmaceutical industries
- XC incubator shakers are optimised for cell cultivation

OPTIONAL
with O_2 control
(PhysOx control)

- Fits in any laboratory
- Accepts flasks up to 6 litres
- Two units can be stacked without the need for special tools or stacking kits

- CO_2 control option available: essential for mammalian, plant cell cultures and algae
- O_2 control available: essential for cultivating cells and microorganisms with low/no oxygen demand
- Controlled humidity option: essential for cultivation in microtiter plates or when cultivating in flasks for long periods
- Heating and cooling
- Heated window and door frame with controlled humidity option
- User-friendly operation: each parameter has its own control
- Retrofitting possible
- Touchscreen option available
- Stainless steel option available

Technical data

• Overview	LT-X(C) * Basic	LT-X(C) * EcoDew®	LT-X(C) * Compressor
Cooling	no	no	yes
Humidity control	no	yes	no / yes
Temperature minimum	ambient + 10 °C	ambient + 10 °C	ambient – 15 °C ***(– 10 °C)****
Temperature maximum	80 °C ***(60 °C)****	80 °C ***(60 °C)****	80 °C ***(60 °C)****
Humidity maximum	–	85% r.h.	– / 85% r.h.
Power consumption	< 700 W	< 1050 W	880 W / < 1150 W

• Machine	
Gas volume	260 litre
Weight (with cooling)	170 kg
Illumination	LED
Ambient temperature	10 °C up to 35 °C

Display / Interface	
Operating menu in	de, fr, it, en, es
Interface, standard	CAN-Bus
Interface, optional	USB, Ethernet, digital, analogue

Temperature	
Setting, digital	0.1 °C
Accuracy, absolute (across the tray)	± 0.30 °C (37 °C) ***± 0.25 °C (37 °C)****
Principle of sensor	Pt-100
Power of heating	500 W
Power of cooling	90…155 W
Air circulation	160 m^3/h

• Shaking unit	
Tray, size	EX (500 × 420 mm)
Loading, maximum	25 kg
Setting, digital	1 rpm
Accuracy, absolute	≤ 800 rpm = ± 0.5 rpm > 800 rpm = ± 1.0 rpm
Timer	1s … 999h
Acceleration	controlled
Active brake	adjustable
Stop on position	adjustable

Shaking motion	Speed
orbital, Ø 12.5mm *	20…500 rpm
orbital, Ø 25.0mm *	20…400 rpm
orbital, Ø 50.0mm *	20…300 rpm
linear 12.5mm *	20…400 rpm
linear 25.0mm *	20…300 rpm
linear 50.0mm *	20…200 rpm

* can be changed / other diameters on request

Humidity	
Max. at 25…55 °C	85% r.h.
Setting, digital	1% r.h.
Accuracy, absolute	± 2% r.h.
Principle of sensor	capacitive
Water refill	automatic
Water heater	180 W
Door heater	90 W

CO_2	
Principle of sensor	Infrared, NDIR
Measuring range	0…20 % CO_2
Setting, digital	0.1%
Accuracy, absolute (including non-linearity, calibration uncertainty and repeatability)	± 0.40% at 5% CO_2
Temperature range	5…60 °C
CO_2-supply	max. 2 bar overpressure

O_2	
Principle of sensor	Zirkonoxyd
Measuring range	0…20.9 % O_2
Setting, digital	0.1%
Accuracy, absolute	± 0.40% at 5% O_2
Temperature range	-10…80 °C
N2-supply	max. 0.5...0.8 bar overpressure

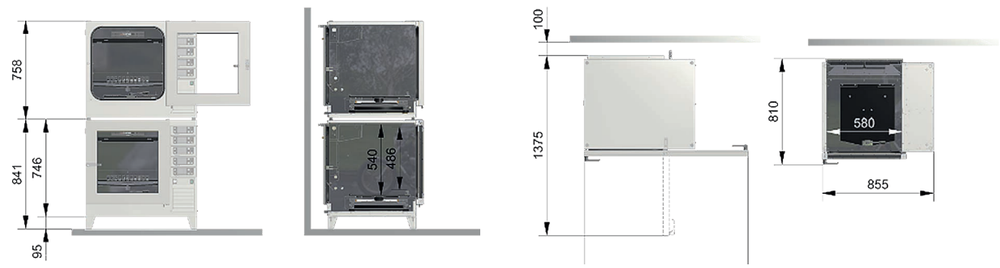
• Mains connection
220 – 240 V / 50 – 60 Hz
190 – 210 V / 50 – 60 Hz
110 – 120 V / 50 – 60 Hz
95 – 105 V / 50 – 60 Hz

Further Options
UV lamp
Black window
Unit for photosynthesis (LED)
TabCom
Shelf

Dual table available on request — Technical data subject to change

*** optimised incubator shaker for cell culture**
+ CO_2 control included as standard
+ Temperature max.: 60 °C
+ Improved temperature accuracy: ± 0.25 °C (37 °C)

Dimensions (mm)



ISF4-X / ISF4-XC

XC incubator shakers are optimised for cell cultivation

- CO_2 control option available: essential for mammalian, plant cell cultures and algae
- Heating and cooling
- Controlled humidity option: essential for cultivation in microtiter plates or when cultivating in flasks for long periods
- 3 mm/1000 rpm option (on request)
- Heated window and door frame with controlled humidity option
- User-friendly operation: each shaking unit and parameter has its own control
- Retrofitting possible
- Touchscreen option available

Four shakers – one footprint

- 4 or even 5 independent, height adjustable shaking units
- Clear view of incubator's contents

High capacity

Technical data

• Overview	ISF4-X(C) * Basic	ISF4-X(C) * Compressor
Cooling	no	yes
Humidity control	no	no / yes
Temperature minimum	ambient + 10 °C	ambient – 10 °C
Temperature maximum	80 °C ***(60 °C)****	80 °C ***(60 °C)****
Humidity maximum	–	– / 85% r.h.
Power consumption	< 1700 W	< 2000 W / 2600 W

• Machine	
Gas volume	1272 litre
Weight (without SF-X)	520 kg
Illumination	2 fl lamps
Ambient temperature	10 °C up to 35 °C

Display / Interface	
Operating menu in	de, en, fr, it, es
Interface, standard	CAN-Bus
Interface, optional	USB, Ethernet, digital, analogue

Temperature	
Setting, digital	0.1 °C
Accuracy, absolute (across the tray)	± 0.30 °C (37 °C)
Principle of sensor	Pt-100
Power of heating	1000 W
Power of cooling	150…420 W
Air circulation	700 m^3/h

• Shaking unit SF-X	(SMX1610)
Tray, size	F (800 × 420 mm)
Loading, maximum	25 kg
Setting, digital	1 rpm
Accuracy, absolute	≤ 800 rpm = ± 0.5 rpm > 800 rpm = ± 1.0 rpm
Timer	1s … 999 h
Acceleration	controlled
Active brake	adjustable
Stop on position	adjustable

Shaking motion	Speed
orbital, Ø 3.0 mm * (option)	20…1000 rpm
orbital, Ø 12.5 mm *	20…500 rpm
orbital, Ø 25.0 mm *	20…400 rpm
orbital, Ø 50.0 mm *	20…300 rpm
linear 12.5 mm *	20…400 rpm
linear 25.0 mm *	20…300 rpm
linear 50.0 mm *	20…200 rpm

* can be changed / other diameters on request

Humidity	
Max. at 25…55 °C	85% r.h.
Setting, digital	1% r.h.
Accuracy, absolute	± 2% r.h.
Principle of sensor	capacitive
Water refill	automatic
Water heater	300 W
Door heater	220 W

CO_2	
Principle of sensor	Infrared, NDIR
Measuring range	0…20% CO_2
Setting, digital	0.1%
Accuracy, absolute (including non-linearity, calibration uncertainty and repeatability)	± 0.40% at 5% CO_2
Temperature range	5…60 °C
CO_2-supply	max. 2 bar overpressure

• Mains connection
220 – 240 V / 50 – 60 Hz
190 – 210 V / 50 – 60 Hz

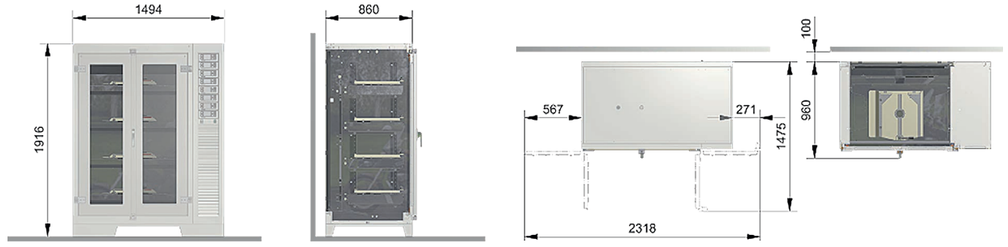
Further Options
Pull-out table
Integrated UV lamp
Black window (2x)
Unit for photosynthesis (LED)
TabCom for standard shaking unit
TabCom for unit with pull-out table
Shelf

Dual table available on request — Technical data subject to change

*** optimised incubator shaker for cell culture**

+ CO_2 control included as standard
+ Temperature max.: 60 °C

Dimensions (mm)



ISF1-Z / ISF1-ZC

ZC incubator shakers are optimized for cell cultivation

- CO_2 control option available: essential for mammalian, plant cell cultures and algae
- Heating and cooling
- Controlled humidity option: essential for cultivation in microtiter plates or when cultivating in flasks for long periods
- 3 mm/1000 rpm option
- Heated window and door frame with controlled humidity option
- User-friendly operation: each parameter has its own control
- Retrofitting possible
- Touchscreen option available

stack up to 3 shakers
Easy to stack without the need for special tools or stacking kits

Automatic door and foot switch option available for easy handling, maximum comfort and automation

Stainless steel option

ISF-Z models and their features

	Cooling / Heating without CO_2 Control	**Cooling / Heating with CO_2 control**
Basic	RT; RT + 10 °C; 80 °C	RT; RT + 10 °C; 60 °C
EcoDew®	RT; RT + 10 °C; 80 °C; 50 %; 85 %	RT; RT + 10 °C; 60 °C; 50 %; 85 %
Peltier	RT - 5 °C; RT; 50 °C	RT - 5 °C; RT; 50 °C
Peltier with humidity control	RT - 5 °C; RT; 60 °C; 50 %; 85 %	RT -5 °C; RT; 60 °C; 50 %; 85 %
Compressor	RT - 22°C (min. 3 °C); RT; 80 °C	RT - 22°C (min. 3 °C); RT; 60 °C
Compressor with humidity control	RT - 22°C (min. 3 °C); RT; 80 °C; 50 %; 85 %	RT - 22 °C (min. 3 °C); RT; 60 °C; 50 %; 85 %

LS-Z with Kuhner Kelvin+

New modular system with a small footprint

Lab-Shaker LS-Z and incubator Kuhner Kelvin+ combine proven Kuhner quality in a new modular system to provide maximum flexibility to our customers. There are three different options:

LS-Z shaker: benchtop only

The LS-Z shaker will accept loads up to 25 kg and the shaking diameter can be adjusted at any time. There are three standard shaking diameters (12.5, 25 and 50 mm) and other diameters are available on request.

LS-Z with Kuhner Kelvin+ incubator

The Kuhner Kelvin+ is a compact-sized incubator with a precise temperature control and an excellent temperature distribution – for reliable and reproducible cultivation processes.

LS-Z in combination with incubators from other manufacturers

Due to low energy dissipation, the LS-Z is perfectly suited for incubator-chambers without cooling, local temperature gradients are not formed. With the detachable electronics (controller unit and power cube), the LS-Z shaker unit can be placed in a lab incubator or in a temperature controlled room with high relative humidity (up to 90%) and high CO_2-concentrations (up to 20%).

Orbital shaken bioreactors (OSB)

Scale-up without compromising quality

SB10-X **SB50-X** **SB200-X** **SB2500-Z**

Easy scale up

- For use in research, process development and production
- Cultivation of human, mammalian, plant and insect cells
- Online measurement of pH and DO
- Single-use bag: requires no additional mixing device, enables quick set up times and eliminates elaborate cleaning and sterilising procedures
- Heating or cooling
- Fast turnaround
- Control unit with touchscreen monitor, software, gas mixing device & pumps

Efficient scale up from lab scale to production scale – scan the QR code for more information.

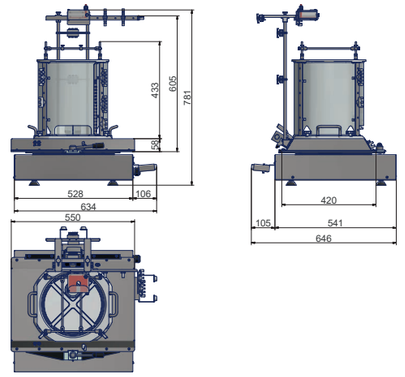
Orbital shaken bioreactors (OSB) • Technical data

• Overview	SB10-X	SB50-X	SB200-X
Shaker speed	20 rpm – 140 rpm	20 rpm – 150 rpm	20 rpm – 80 rpm
Shaker diameter	50 mm (orbital motion) Shaking diameter is adjustable (12.5 mm, 25 mm, 50mm)	50 mm (orbital motion)	50 mm (orbital motion)
Weight bioreactor incl. shaker	approx. 75 kg without liquid	approx. 340 kg without liquid	approx. 400 kg without liquid
Accuracy, absolute	± 0.5 rpm	± 0.5 rpm	± 0.5 rpm
Setting, digital	1 rpm	1 rpm	1 rpm
Active brake	adjustable	adjustable	adjustable
Interface	CAN-Bus, RS232	CAN-Bus, RS232	CAN-Bus, RS232
Temperature	up to 40 °C	up to 40 °C	up to 40 °C
Cooling	–	cooling coils are incorporated for connection to an external cooling system (pressure < 0.2 bar)	cooling coils are incorporated for connection to an external cooling system (pressure < 0.2 bar)
pH and DO input	1× pH / 1× DO	1× pH / 1× DO	2× pH / 2× DO
Single-use bag	Standard disposable bag SB10 Basic disposable bag SB10 Perfusion disposable bag SB10	Standard disposable bag SB50 Basic disposable bag SB50	Standard disposable bag SB200 Basic disposable bag SB200
• Control unit	with touchscreen monitor, Kuhner Insight Software, gas mixing device & pumps	with touchscreen monitor, Kuhner Insight Software, gas mixing device & pumps	
• pH and DO control	**Integrated in tray module**	**Integrated in Reader Box**	
pH measurement	principle: optical chemosensor	principle: optical chemosensor	
Range	pH 5.5 – pH 8.5	pH 5.5 – pH 8.5	
Accuracy (chemosensor)	± pH 0.05 at pH 7 with one point calibration ± pH 0.10 at pH 7 with pre-calibration	± pH 0.05 at pH 7 with one point calibration ± pH 0.10 at pH 7 with pre-calibration	
Drift	< pH 0.005 per day	< pH 0.005 per day	
Temperature range	up to 50 °C	up to 50 °C	
DO measurement	principle: optical chemosensor	principle: optical chemosensor	
Range	0% – 100% DO	0% – 100% DO	
Accuracy (chemosensor)	± 0.1% O_2 at 20.9% O_2	± 0.1% O_2 at 20.9% O_2	
Accuracy (system)	± 10% DO	± 10% DO	
Drift	< 0.015% O_2 per day	< 0.015% O_2 per day	
Temperature range	up to 50 °C	up to 50 °C	
• Filter heater			
Capacity	1 exhaust filter	2 exhaust filters	
Casing	polycarbonate		
Heating	resistance heater (6 W)		
Max. temperature	approx. 40 °C at 23 °C ambient temperature	approx. 45 °C at 23 °C ambient temperature	
Control	orange LED lights indicate that filter heater is active and working	controlled by Kuhner Insight Software	
• Mains connection			
	220 – 240 V / 50 – 60 Hz		
	110 – 120 V / 50 – 60 Hz		
	95 – 105 V / 50 – 60 Hz		

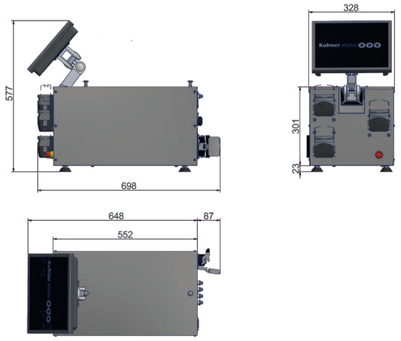
Technical data subject to change

Dimensions (mm)

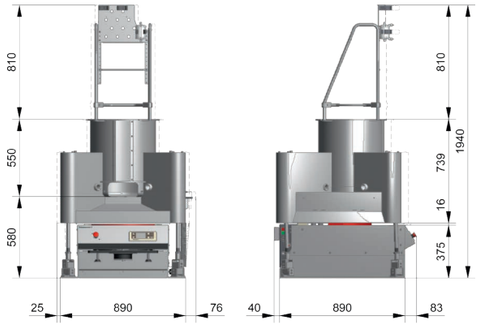
SB10-X



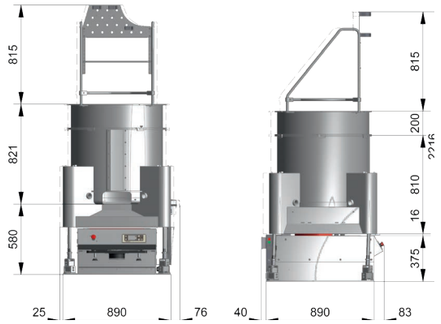
Control unit SB10-X

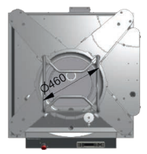


SB50-X

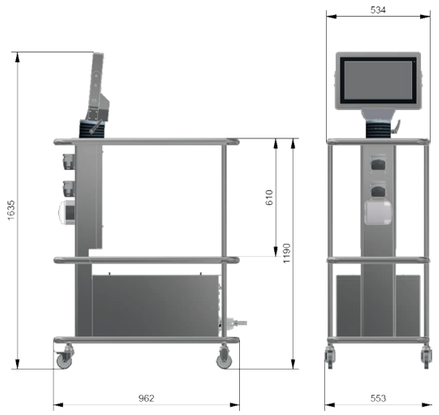


SB200-X





Control unit SB50-X and SB200-X



Knowledge transfer

Shaker Laboratory

Kuhner AG offers advice on cultivations in shaken bioreactors. Our in-house laboratory uses a number of online-measuring methods and computer based models to support our customers.

Collaboration with universities, especially with academic partners Prof. Büchs (AVT, RWTH Aachen, Germany) and Prof. em. Wurm (LBTC, EPFL Lausanne, Switzerland), can also provide answers to complex questions. This consultation service is confidential of course and free of charge for Kuhner customers.

Seminars and Trainings

Furthermore, Kuhner carries out seminars which address questions about cultivation conditions and offer suggestions for optimising the operation of your shaken bioreactors (shake flasks, microtiter plates, tubespins etc.). Kuhner owns Mas Boada, a science resort near Barcelona, where product trainings and seminars about shaken cultivation are held.

A scientific poster gallery on our website completes our support service. Posters can be enlarged and downloaded. Take a look at: www.kuhner.com

Mas Boada Science Resort with conference rooms and laboratory space

Rack System

Extendable Rack System

SBM/SS-X

- Ideal for temperature controlled rooms, laboratories and corridors
- Each shaking unit has its own direct drive
- Size and configuration can be altered at any given time

• Technical data	SBM / SEM
Weight SBM	54 kg
Consumption, maximum	240 W (4 machines, max. acceleration)
Consumption, maximum	480 W (4 machines with high torque drive)
Consumption, typical	50 W (4 machines)
Ambient temperature	0 °C up to 60 °C

Display / Interface	
Operating menu in	de, fr, en, it, es
Interface, standard	CAN-Bus
Interface, optional	USB, Ethernet, digital, analogue

• Shaking unit SS-X	
Weight SS-X	60 kg
Tray, size	F (800 × 420 mm)
Loading, maximum	25 kg
Setting, digital	1 rpm
Accuracy, absolute	≤ 800 rpm = ± 0.5 rpm > 800 rpm = ± 1.0 rpm
Timer	1s … 999 h
Acceleration	controlled
Active brake	adjustable
Stop on position	adjustable

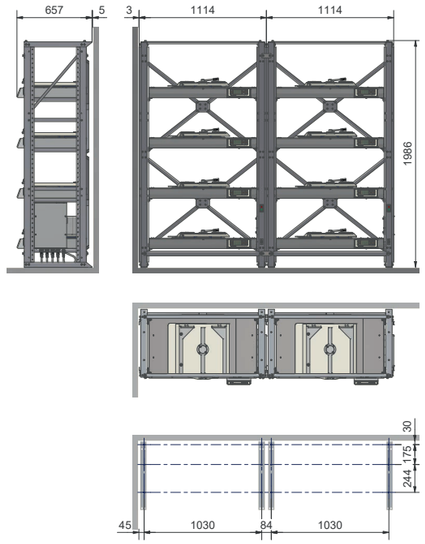
• Shaking motion	Speed
orbital, Ø 12.5 mm *	20…500 rpm
orbital, Ø 25.0 mm *	20…400 rpm
orbital, Ø 50.0 mm *	20…300 rpm
linear 12.5 mm *	20…400 rpm
linear 25.0 mm *	20…300 rpm
linear 50.0 mm *	20…200 rpm

* can be changed / other diameters on request

• Mains connection
220 – 240 V / 50 – 60 Hz
190 – 210 V / 50 – 60 Hz
110 – 120 V / 50 – 60 Hz
95 – 105 V / 50 – 60 Hz

Technical data subject to change

Dimensions (mm)



Science Room

Partner of Science

In our Science Room, we offer general information and data of cultivation processes in shaken bioreactors. We provide scientific data and results of experiments in shaken bioreactors for example as well-arranged and informative posters, as application data for download or in our FAQ section.

Science Room

Shaking Technology Forum

Shaking Technology Group

Youtube

Custom-made

Tell us your requirements!

Send us a sample of the container that needs to be shaken.
We will build a suitable holder.

Kuhner Atelier – A department for custom-made products

Each of our customized solutions is specifically adapted to the user's request. Our Kuhner Atelier team provides the expertise and advice to find the optimal solution for each customer and will happily address any questions or technical issues.

If you have any questions regarding our customized solutions or products in general, please contact us: atelier@kuhner.com

Custom-made accessories, an everyday occurrence for us.

High performance Swiss Technology
by Kuhner AG

Options

UV lamp

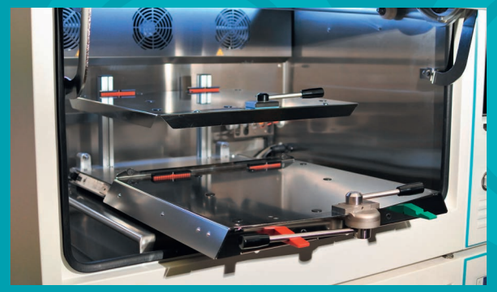
The chamber of an incubator shaker can be sterilized with an integrated UV lamp. The UV lamp has a clearly labelled external switch.

Black window

Available for light sensitive medium or organisms. Any Kuhner incubator shaker can be delivered with blackened windows to prevent unwanted daylight or UV radiation inside the incubator.

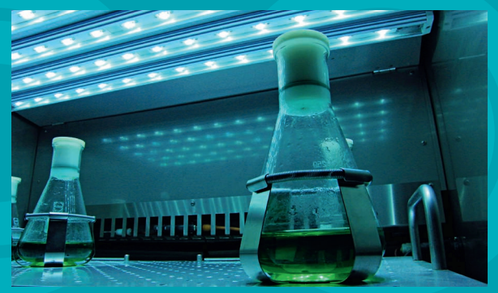
Pull-out table

With a pull-out table loading and unloading trays is much easier.



Dual table

The dual table is an easy and economical way of doubling the shaking capacity. It consists of two levels. Each level will accept an E, EX or F size tray. However, the shaking speed is limited.



Illumination unit for photosynthesis (LED)

The ceiling of any Kuhner incubator shaker can be fitted with LED modules for the cultivation of phototrophic organisms. The control module allows full programming of night/day cycles and variable light intensity.

- Order this unit together with cooling.

3 mm / 1000 rpm

This option enables the user to run cultivations at 3 mm orbit and 1000 rpm frequency. For more information and specific technical data visit our website.

Shelf

The incubator shakers as well as the Rack System can be fitted with a shelf allowing cultivation in petri dishes. The shelf is fitted above the shaking table.

IQ OQ

IQ/OQ Documentations

IQ-OQ (Installation Qualification and Operation Qualification) is an equipment qualification required for GMP procedures.

Documentation is available from Kuhner and Qualification services can also be provided at the customer's premises.

- Available for each shaker

Options

EPFL-table

This table accepts for example up to five tube holders, each with a capacity of 24 x 50 ml tubes. The EPFL table is available for the ISF1-Z, ISF4-X, LT-X and LS-Z.

Light shade

Available for light sensitive medium or organisms to prevent unwanted daylight or UV radiation inside the incubator. The Light shade can be removed.

Touchscreen

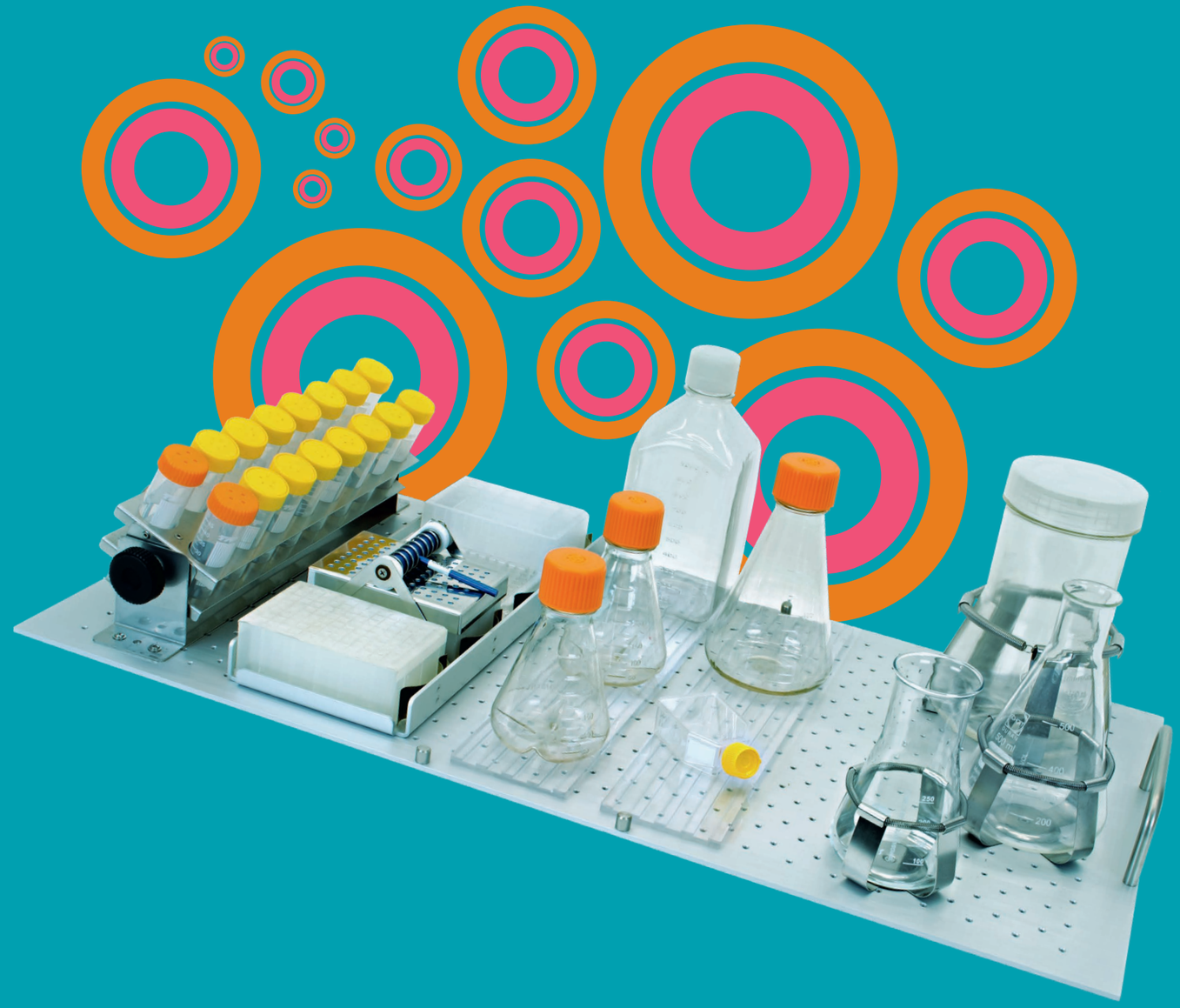
Touchscreen with Kuhner Insight Software for advanced operation. Available for ISF1-Z, ISF4-X and LT-X.

Floor stands with wheels

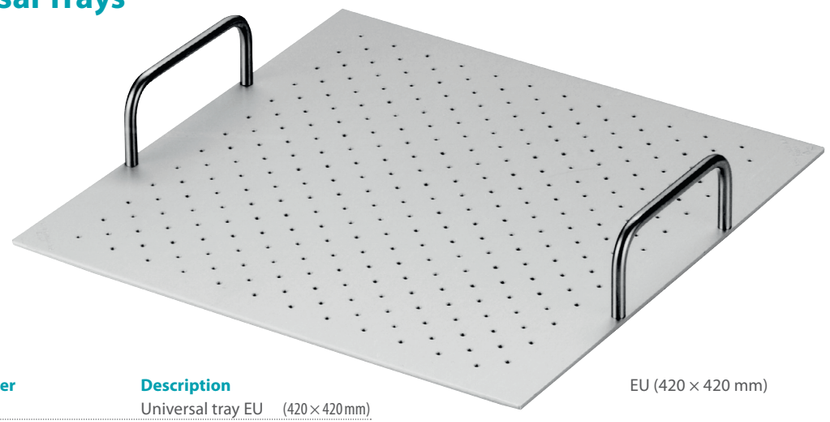
This floor stands with wheels for the ISF1-Z enables moving the machine easily. Also available for the LT-X.

Accessories

Universal system
FU-tray with various holders



Universal Trays



EU (420 × 420 mm)

• Order number	Description	
102201	Universal tray EU	(420 × 420 mm)
102207	Universal tray EXU	(500 × 420 mm)
102212	Universal tray FU	(800 × 420 mm)
107420	Universal tray CU	(800 × 660 mm)

Clamps

• Clamps for Erlenmeyer flasks		Number of clamps per Universal tray *			
Order number	Erlenmeyer flask size	Tray EU 420 × 420 mm	Tray EXU 500 × 420 mm	Tray FU 800 × 420 mm	Tray CU 800 × 660 mm
101405	25 ml	80	90	113	175
101406	50 ml	49	56	100	143
101407	100 ml	36	45	72	88
101408	125 ml	26	35	50	99
101409	150 ml	26	35	50	96
101410	200 ml	24	27	44	64
101411	250 ml	20	24	40	58
101412	300 ml	18	22	37	56
101413	500 ml	14	16	27	42
101415	1000 ml	9	10	16	20
101416	1500 ml	5	6	12	16
101417	2000 ml	5	5	9	12
101424	2800 ml Fernbach	2	3	5	8
101425	5L Thomson/ 3L Corning Fernbach	2	2	5	8
101418	3000 ml	4	5	8	11
101419	4000 ml	2	3	5	8
101426	5000 ml	2	3	4	6
101421	6000 ml	1	2	4	6

* This information on U-trays is not guaranteed due to flask size variation from different manufacturers.

Test tube holders

			Number of holders per Universal tray		
Order number	Tube size	Description	EU (420 × 420 mm)	EXU (500 × 420 mm)	FU (800 × 420 mm)
102171	16 mm dia. (15 ml Falcon)	RGH-16 24 tubes	5	6	9
102176	18 mm dia.	RGH-18 24 tubes	5	6	9
102178	20 mm dia.	RGH-20 18 tubes	5	6	9
102181	25 mm dia.	RGH-25 16 tubes	3	4	6
102182	28 mm dia. (50 ml Falcon)	RGH-28 16 tubes	3	4	6
102183	30 mm dia.	RGH-30 14 tubes	3	4	6
102194	32 mm dia.	RGH-32 14 tubes	3	4	6
102195	34 mm dia.	RGH-34 14 tubes	3	4	6

High capacity tube holders

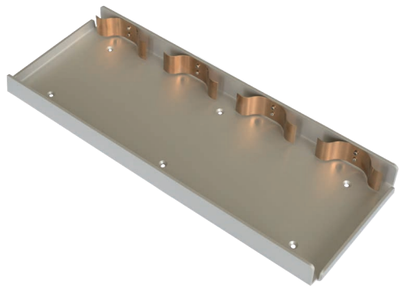
		Number of holders per Universal tray		
Order number	Description	EU (420 × 420 mm)	EXU (500 × 420 mm)	FU (800 × 420 mm)
100639	Holder for 24 × 50 ml Falcon/TPP tubes	2	3	5
100633	Holder for 3 × 600 ml reactors	2	3	5
104974	F-Tray for TubeSpin-Bioreactor	–	–	28

Sticky strips

• Order number	Description
105194	1 sticky strip (385 × 85 × 6 mm)
105226	Set of sticky strips for E-size tray (4 strips)
105227	Set of sticky strips for EX-size tray (5 strips)
105228	Set of sticky strips for F-size tray (8 strips)

Holder for deep well microtiter plates

Duetz Light System

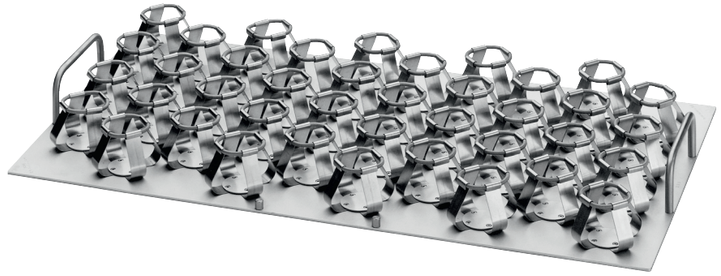


		Number of holders per Universal tray		
Order number	Description	EU (420 × 420 mm)	EXU (500 × 420 mm)	FU (800 × 420 mm)
104968	Single Duetz Holder	8	10	16
104953	MTP holder 4 (Universal)	2 (12 MTP)	3 (16 MTP)	5 (20 MTP)

Special tray

• Order number	Description
100546	Special universal tray, FUM-V with V support (Clamps not included)
101425	U-3000F clamp for Fernbach flasks: 1 × 5L Thomson flask or 1 × 3L Corning Fernbach flask
104956	F-size tray with pins (800 x 420 mm) for seven flasks: 3L / 5L Corning 5L Thomson

Trays with fixed clamps



• E-tray (420 × 420 mm)

Order number	Description	Number of clamps
101525	E- 25 ml	81
101526	E- 50 ml	50
101527	E- 100 ml	39
101528	E- 125 ml	30
101529	E- 150 ml	30
101530	E- 200 ml	20
101531	E- 250 ml	18
101532	E- 300 ml	15
101533	E- 500 ml	12
101534	E-1000 ml	9
101535	E-1500 ml	5
101536	E-2000 ml	5
101537	E-3000 ml	4
101538	E-4000 ml	2
101539	E-5000 ml	2
101540	E-6000 ml	1

• EX-tray (500 × 420 mm)

Order number	Description	Number of clamps
101541	EX- 25 ml	90
101542	EX- 50 ml	60
101543	EX- 100 ml	42
101544	EX- 125 ml	36
101545	EX- 150 ml	32
101546	EX- 200 ml	25
101547	EX- 250 ml	21
101548	EX- 300 ml	18
101549	EX- 500 ml	14
101550	EX-1000 ml	9
101551	EX-1500 ml	8
101552	EX-2000 ml	5
101553	EX-3000 ml	4
101554	EX-4000 ml	3
101555	EX-5000 ml	3
101556	EX-6000 ml	2

• F-tray (800 × 420 mm)

Order number	Description	Number of clamps
101557	F- 25 ml	153
101558	F- 50 ml	100
101559	F- 100 ml	74
101560	F- 125 ml	60
101561	F- 150 ml	60
101562	F- 200 ml	40
101563	F- 250 ml	40
101564	F- 300 ml	30
101565	F- 500 ml	26
101566	F-1000 ml	16
101567	F-1500 ml	12
101568	F-2000 ml	9
on request	F-2800ml	6
101569	F-3000 ml	8
101570	F-4000 ml	5
101571	F-5000 ml	4
101572	F-6000 ml	3

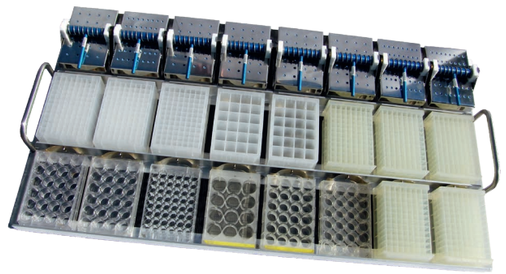
• C-tray (800 × 660 mm)

Order number	Description	Number of clamps
on request	C- 25 ml	238
on request	C- 50 ml	153
on request	C- 100 ml	116
on request	C- 125 ml	96
on request	C- 150 ml	96
on request	C- 200 ml	75
on request	C- 250 ml	65
on request	C- 300 ml	55
on request	C- 500 ml	42
on request	C-1000 ml	24
on request	C-1500 ml	18
on request	C-2000 ml	15
on request	C-3000 ml	11
on request	C-4000 ml	8
on request	C-5000 ml	6
on request	C-6000 ml	6

Trays for microtiter plates

• E-tray (420 × 420 mm)

Order number	Description	Number of MTP
104947	E-MT.22	12 – 24
104950	E-MT.47	12 – 48
104948	E-MT.77	12 – 72



• F-tray (800 × 420 mm)

Order number	Description	Number of MTP
104900	F-MT.22	24 – 48
104894	F-MT.47	24 – 96
104898	F-MT.77	24 – 144

• C-tray (800 × 660 mm)

Order number	Description	Number of MTP
on request	C-MT.22	35 – 70
on request	C-MT.47	35 – 140
on request	C-MT.77	35 – 210

• Trays for microtiter plates

Order number	Description	Number of MTP
104806	E-tray (420 × 420 mm) for deepwell or microtiter plates	1 – 12
104794	EX-tray (500 × 420 mm) for deepwell or microtiter plates	1 – 15
104825	F-tray (800 × 420 mm) for deepwell or microtiter plates	1 – 24

• F-2D-Bag-tray

Order number	Description
105052	Tray (flex) for 2D-bag with 1/5/10L working volume
105017	Tray (cryo) for 2D-bag with 1/5/10L working volume

Trays with sticky strips

• Order number | Description | # of sticky strips

105169	E-size tray	4
105199	EX-size tray	5
105200	F-size tray	8

Sticky strip: 385 × 85 × 6 mm

• Order number | Description | # of sticky strips

105224	EX-size tray with PC-plate	5
100531	F-size tray with PC-plate	8

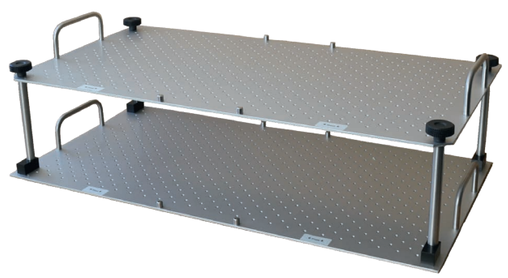
1 sticky strip: 385 × 85 × 6 mm
1 big sticky strip: 395 × 385 × 6 mm

Trays with rubber mat

• Order number | Description

105312	Rubber mat EG	420 × 420 mm
105313	Rubber mat EXG	500 × 420 mm
105311	Rubber mat FG	800 × 420 mm

Dual tray



• Order number | Description

102217	Dual tray FU	height 180 mm
102218	Dual tray F	height 180 mm
100548	Dual tray EXU	height 200 mm
102226	Dual tray EX	height 200 mm

Add-ons

Trays with support bars

• Order number	Description	# of longitudinal girders
106408	EA-tray with rubber mat and 4 cross supports	2
106407	EXA-tray with rubber mat and 4 cross supports	2
106134	FA-tray with rubber mat and 6 cross supports	2

Floor stands

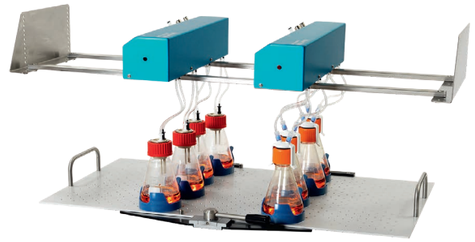
For a comfortable working height Kuhner offers floor stands for both the ISF1-Z and LT-X incubator shakers. These are available in a choice of 400 mm or 765 mm high.

• Order number	Description
101866	400 mm high for 2 × ISF1-Z
101863	765 mm high for 1 × ISF1-Z
100834	400 mm high for 2 × LT-X
100838	765 mm high for 1 × LT-X

Water baths

To reduce evaporation from shake flasks or microtiter plates a stainless steel water bath can be placed inside the incubator.
This water bath is not fitted with an automatic water supply and must be topped up manually.

• Order number	Description
102289	ISF1-X and ISF4-X
100799	LT-X
104474	ISF1-Z



ONLINE

Kuhner TOM

Online Measurement

Kuhner TOM (Transfer-Rate Online Measurement) measures OTR, CTR and RQ in shake flasks for a better understanding of any bioprocess.

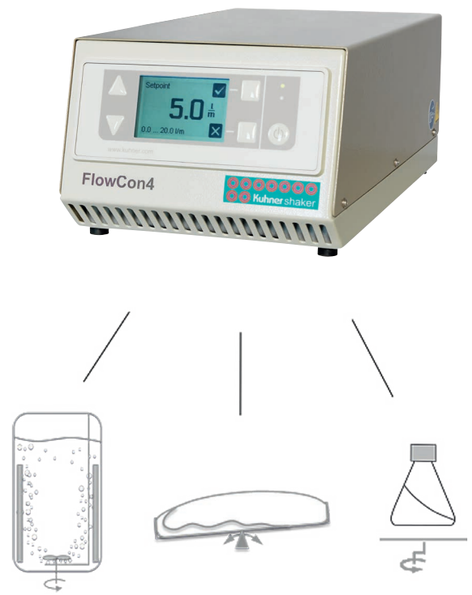
FEED

Feed Beads® / Feed Plates® / Feed Tubes®

Controlled glucose delivery by slow release technology

FeedBeads provide substrate limited fed-batch conditions in shake flasks or microtiter plates without the need for enzymes or additional equipment such as tubing or pumps.

www.feedingtechnology.com



FlowCon 2/3/4

Gas mixing device

The FlowCon is used for stabilizing the pH in cell cultivations with CO_2 or reducing oxygen concentration for microaerophilic organisms.

- Mixing up to four gases
  (gas mixtures can also be connected)
- Selectable flow rates:
  0 – 2 [sL/min], 0 – 20 [sL/min]

The FlowCon can be used as a stand-alone device or can be integrated with the Kuhner equipment family (Incubator shakers and orbital shaken bioreactors).

Kuhner

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