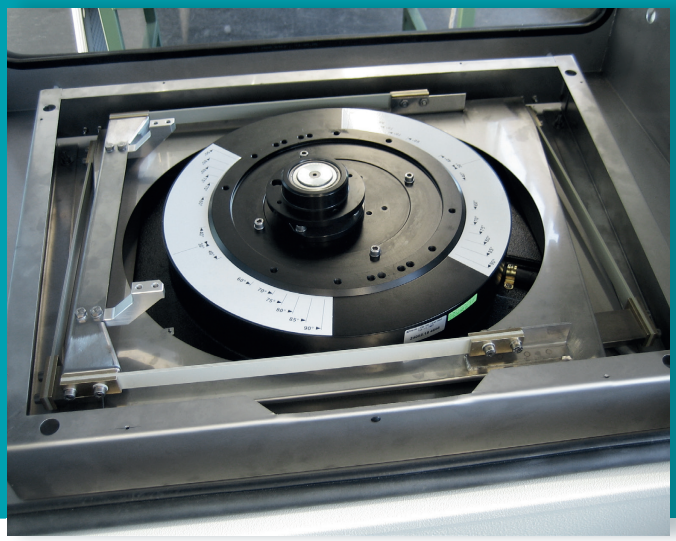
Kuhner shaker

LT-X (Lab-Therm)

Space saving
stackable incubator shaker

Lab-Therm LT-X

1 Direct drive



- Fits into any laboratory
- Used in biotech and pharmaceutical industries
- Accepts flasks up to 6 litres
- Two units can be stacked - no special kits or tools required
- Humidity, CO_2 and O_2 control available

The Kuhner LT-X (Lab-Therm) incubator shaker has the same capabilities as the larger ISF1-X and ISF4-X models. The incubator shaker was specially developed to address the shaking needs of the biotechnology and pharmaceutical industries. The practical size of the LT-X means it will fit in any laboratory.

Extra space

Exceptional chamber height means flasks up to 6 litres capacity can be accommodated. If using smaller flasks, there is sufficient head height to fit one or two shelves above the shaking table. It is also possible to stack two LT-X together without the need for special kits or tools.

Functionality through direct drive 1

The maintenance-free direct drive guarantees long and economical performance from the LT-X. The shaking diameter can be changed at any time thanks to Kuhner's unique direct drive system. The integrated drive is protected from spills and the all stainless steel interior has a drain at the back for any unwanted liquids. The chamber can be cleaned using chemicals or sterilized with optional UV lighting.

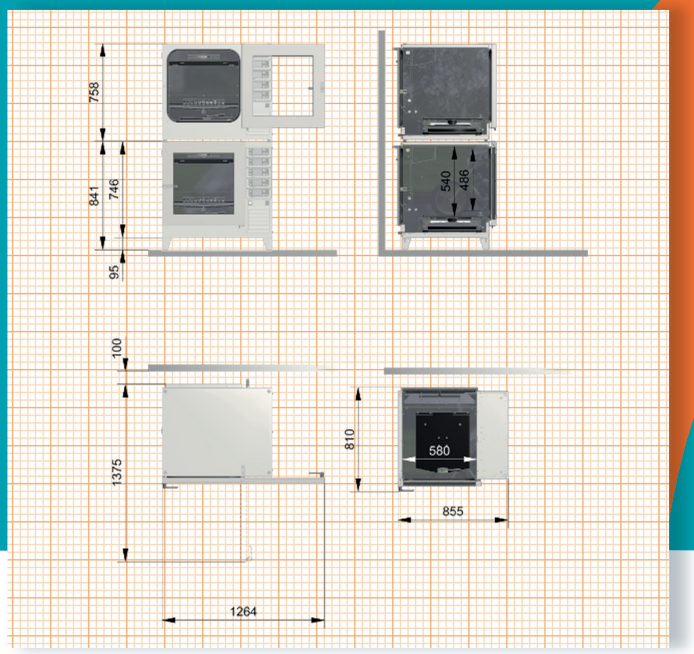
Safety and quality

A door switch ensures the motor stops as soon as the door is opened. After closing the door properly, the motor restarts. The safety, reliability and quality of our shakers are of personal concern to everyone at Kuhner which is why all our machines are supplied with a 5 year warranty.

Configuration

The LT-X can be equipped with options for CO_2, controlled humidity, LED photosynthesis, UV lighting and much more. It is now also possible to integrate measuring data from Kuhner shakers with your company's own network using Kuhner Insight software together with the NET-60 interface.

Dimensions



Technical data	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	< 700W	< 1050W	< 880W / < 1150W

Machine

Gas volume	260 l
Weight (with cooling)	170 kg
Illumination	LED
Operation menu in	de, fr, it, en, es
Interface, standard	CAN-Bus
Interface, optional	USB, Ethernet, digital, analogue
Ambient temperature	10°C up to 35°C

Shaking unit

Tray, size	EX (500x420mm)
Loading, maximum	25kg
Setting, digital	1rpm
Accuracy, absolute	± 0.5 rpm
Timer	1s ... 999h
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

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	500W
Power of cooling	90…155W
Air circulation	160m3/h

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	180W
Door heater	90W

CO_2

Principle of sensor	Infrared, NDIR
Measuring range	0...20% CO_2
Setting, digital	0.1%
Accuracy, absolute (including non-linearity, repeatability and calibration uncertainty)	± 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

**** XC incubator shakers are optimised for cell cultivation***

+ CO_2 control included as standard
+ Temperature max.: 60°C
+ Improved temperature accuracy: ± 0.25°C (37°C)

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

Options

Multiple options for your shaker

Cooling
All Kuhner incubator shakers can be fitted with cooling. The refrigeration system is regulated by a fully digital PID control ensuring minimal energy consumption. The cooling is switched on only when required as determined by the chamber temperature and set point.

Humidity control
Humidity control is an important factor in successful fermentation. Evaporation from microtiter plates, or when cultivating in flasks for long periods (e.g. cell cultures), can be significantly reduced with humidification.

CO_2 control
CO_2 control is essential when working with mammalian cell cultures. Kuhner was the first company to manufacture and supply incubator shakers with CO_2 control more than ten years ago and continues to offer this option.

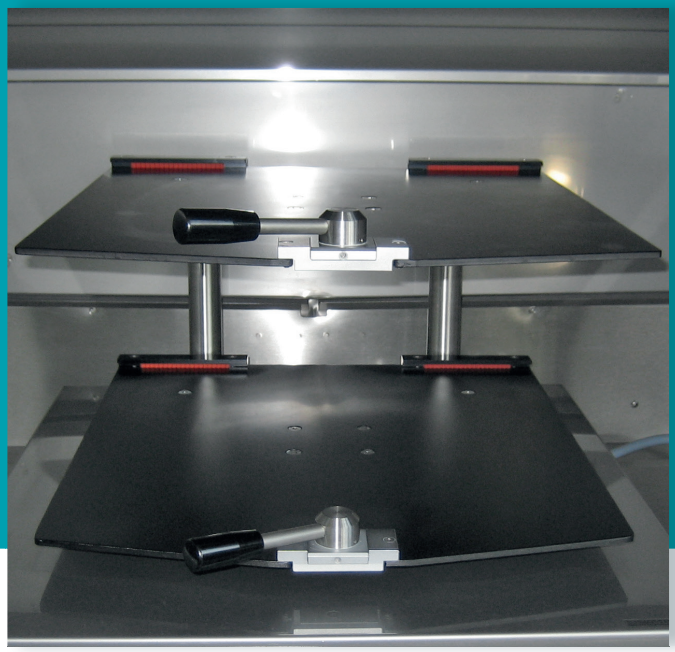
Kuhner XC series
Kuhner was the first company to manufacture incubator shakers with controlled CO_2 and humidity for the cultivation of mammalian cells. The «XC» series provides optimised shaking conditions for cell cultures. Improved temperature accuracy is achieved across the tray: +/- 0.25°C @ 37°C. The CO_2 controlled atmosphere allows exact pH adjustment of the cell culture medium. With a CO_2 range up to 20%, as well as options for cooling and controlled humidity, the «XC» incubator shakers can be tailored to meet all requirements.

O_2 control
A reliable control of O_2 is essential for cultivating cells (proliferation and metabolism of stem cells) and microorganisms with low/no oxygen demand. The O_2 controller reduces the O_2 level from ambient (20.95% at dry air; normoxia) to approximately 0% O_2 (hypoxic). A digital PID controller adjusts the N_2 flow rate to maintain the desired O_2 value.

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.

UV lamp
As in a biological safety cabinet, the chamber of a Kuhner incubator shaker can also be sterilized with an integrated UV lamp. The lamp is positioned for maximium irradiation of the chamber and shaking table. The UV lamp has a clearly marked external switch and when the door is opened, the UV-lighting is automatically switched off.

2 Dual table



3 BPM-60

Touchscreen
This option includes a 7-inch touchscreen with our Kuhner Insight Software. The touchscreen has been designed for simple operation, monitoring and programming. It can also be retrofitted to existing incubator shakers.

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.

Dual table 2
The dual table is an easy and economical way of doubling the shaking capacity. The dual shaking table consists of two levels. Each level will accept an E or EX size tray. However, with the dual table the shaking speed is limited to a maximum of 200 rpm.

Perspex cover
To prevent accidental operation of the controllers, the panel can be protected by a perspex cover.

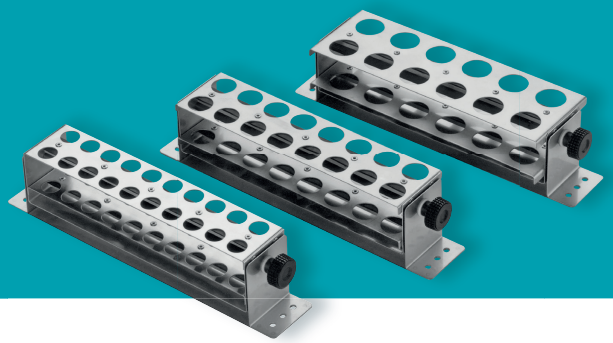
IQ-OQ Documentation
IQ-OQ (Installation Qualification and Operation Qualification) is an equipment qualification required for GMP procedures. This service is available from Kuhner and can also be carried out at the customer`s premises.

BPM-60 3
BPM-60 (Bioprocess Monitoring) is a non-invasive, online measurement of dissolved oxygen and pH in an Erlenmeyer flask.
The system allows for one or both parameters to be recorded in the same flask. The values of dissolved oxygen and/or pH can be monitored simultaneously in eight different flasks. Compared to conventional sample taking, this continuous data logging is automatic and consistent.
An integrated socket (TabCom option) in the shaking table makes simple data communication and power supply possible without the risk of wiring breaking.

TabCom
The TabCom option from Kuhner consists of a cable for power and data with the connection port integrated in the shaking table. A cable guide prevents the cable breaking and ensures secure data recording. Online measuring technologies offered by Kuhner that use TabCom include BPM-60 (pH, dissolved oxygen) and RAMOS (OTR, CTR). The flexibility of TabCom means other measurement systems can be easily integrated.

Clamps of different sizes

Test tube holders



Accessories

To suit your application

Universal tray EXU

Order number: 102207

The universal tray can be fitted with clamps for Erlenmeyer flasks, test tube holders, microtiter plates, sticky strips, or custom made holders to suit your requirements.
Rearranging these clamps and holders is quick and simple.

EX-tray with fixed clamps

The clamps are riveted onto these trays and cannot be removed. They offer maximum security and will often hold a larger number of flasks than universal trays. These trays are available in a variety of flask clamp sizes from 25 to 6000ml.

Clamps for Erlenmeyer flasks

Order number for 1 clamp	Flask size	Max. number of clamps per EXU
101405	25 ml	90
101406	50 ml	56
101407	100 ml	45
101408	125 ml	35
101409	150 ml	35
101410	200 ml	27
101411	250 ml	24
101412	300 ml	22
101413	500 ml	16
101415	1000 ml	10
101416	1500 ml	6
101417	2000 ml	5
101418	3000 ml	5
101419	4000 ml	3
101420	5000 ml	3
101421	6000 ml	2
101424	*2800 ml Fernbach*	*3*
101425	*5 L Thomson/ 3 L Corning Fernbach*	*2*

Order number	Description	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

4 **EX-tray for centrifuge tubes**

5 **Floor stand**

EX-tray with sticky strips

Order number: 105199

A tray fitted with sticky strips is especially useful for flasks shaken at low speeds (up to 200 rpm). The flask is placed directly on the sticky strip without the need for any other support. Different flask sizes can be used. Sticky strips are available individually or in sets and can also be supplied already fitted to a tray. The EX-size tray accepts five strips.

EX-tray for centrifuge tubes 4

Order number: 102207 + 3x 100639

The use of centrifuge tubes (e.g. 50ml Falcon tubes and TPP 50ml tubes) in cell culture screening is well established. This EX-tray has a capacity of 72 x 50ml centrifuge tubes (3 racks of 24).
Holders for 600ml TPP tubes are also available.

E-tray (420 x 420 mm) for microtiter plates

Kuhner has designed trays specifically for microtiter plates. Handles at the front of the tray open and close the special clamping mechanism allowing plates to be loaded and unloaded. Trays of different heights (22, 47 and 77mm) allow the stacking of up to four microtiter plates. The tray is suitable for all types of plates (deep well, low well, 24, 48 and 96 well).

Order number	Description	Microtiter plates
104947	E-MT.22	12 - 24
104950	E-MT.47	12 - 48
104948	E-MT.77	12 - 72

EX-tray with support bars

Order number: 106407

These trays offer an alternative to both clamps and sticky mats and are ideal for tall containers. The tray is covered with a rubber mat and has an upright at each corner. The EX size tray is fitted with four cross supports to securely clamp containers.

EX-tray with rubber mat

Order number: 105313

The whole tray is covered with a rubber mat and is particularly suitable for shaking containers at low speed (e.g. blood bags).

Floor stand 5

Order numbers: 100834 (2 x LT-X), 100838 (1 x LT-X)

For a comfortable working height Kuhner offers floor stands for the LT-X. These are available in a choice of 400mm (2 x LT-X) or 765mm (1 x LT-X) high.

Shelf

Order number: 102017

The Kuhner LT-X incubator shaker can be fitted with a shelf allowing cultivation in petri dishes. One or two shelves can be placed above the shaking table and fixed to the chamber walls with four screws.

Water bath

Order number: 100799

To reduce evaporation from shake flasks or microtitre 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.

Kuhner Insight Software

The user-friendly Kuhner Insight software was developed 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.

More accessories under www.kuhner.com

Shakers & Accessories

www.kuhner.com

Kuhner

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