

Kuhner shaker

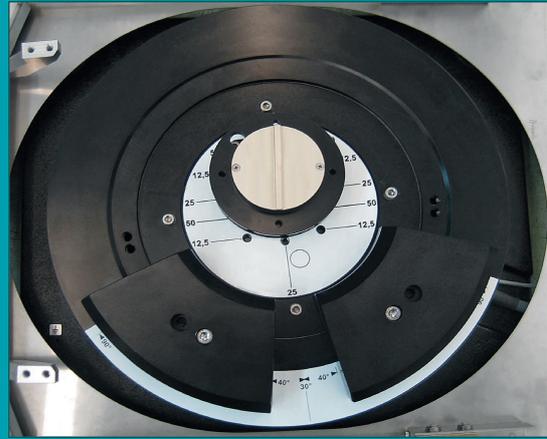
# ISF4-X (Climo-Shaker)

Incubator shaker with large shaking capacity



## ISF4-X with 4 shaking units

## 1 Direct drive



- + All stainless steel interior
- + Large shaking capacity
- + Easy access to contents
- + Each shaking unit has its own direct drive
- + Door heating, with controlled humidity

The Kuhner ISF4-X incubator shaker offers large shaking capacity with temperature, humidity and CO<sub>2</sub> control all available. The shaker cabinet can incorporate four or even five independent shaking units which are height adjustable. The shaking diameter and speed of each unit can be individually selected. Standard diameters are 12.5, 25 and 50 mm. Other shaking diameters are possible.

### Guaranteed quality

When designing the ISF4-X special emphasis was placed on reliability and durability. The high quality of Kuhner shaking machines is backed with a five year warranty.

### Safety and convenience

The large door opening of the ISF4-X allows easy access to the shake flasks inside. The doors are fitted with a safety switch to ensure shaking stops when the doors are opened. The large windows allow a clear view of incubator's contents. The entire ISF4-X chamber is clad in stainless steel making sterilisation with chemicals possible.

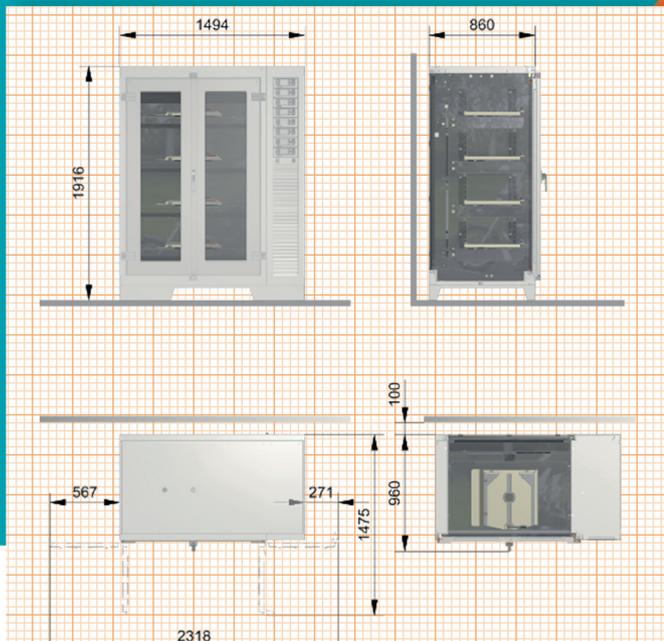
### Energy saving operation 1

The highly efficient direct drive system means economic low power consumption and the cooling system is also energy efficient.

### Electrical protection

Automatic supervision of the mains voltage protects the shaker and in the event of a voltage spike the unit disconnects from the mains. The machine resumes operation at the set values once power is restored.

## Dimensions



Technical data	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	< 1700W	< 2000W / < 2600W

Machine	Temperature
Gas volume	Setting, digital
Weight (with cooling)	Accuracy, absolute
Weight with 4xSF-X	(across the tray)
Illumination	Principle of sensor
Operation menu in	Power of heating
Interface, standard	Power of cooling (electric)
Interface, optional	Air circulation
Ambient temperature	

Shaking unit SF-X	Humidity
Tray, size	max. at 25..55°C
Loading, maximum	Setting, digital
Setting, digital	Accuracy, absolute
Accuracy, absolute	Principle of sensor
Timer	Water refill
Acceleration	Water heater
Active brake	Door heater
Stop on position	

Shaking motion	CO <sub>2</sub>
* orbital, Ø 12.5mm	Principle of sensor
* orbital, Ø 25.0mm	Measuring range
* orbital, Ø 50.0mm	Setting, digital
* linear, 12.5mm	Accuracy, absolute
* linear, 25.0mm	(including non-linearity, repeatability and calibration uncertainty)
* linear, 50.0 mm	Temperature range
* can be changed/other diameters on request	CO <sub>2</sub> -supply

Mains connection
220 - 240 V / 50-60 Hz
190 - 210 V / 50-60 Hz

Technical data subject to change

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

- + CO<sub>2</sub> control included as standard
- + Temperature max.: 60°C

## ② Illumination unit for photosynthesis (LED)



## 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<sub>2</sub> control

CO<sub>2</sub> control is essential when working with mammalian cell cultures. Kuhner was the first company to manufacture and supply incubator shakers with CO<sub>2</sub> 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<sub>2</sub> 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: +/- 0.30°C @ 37°C. The CO<sub>2</sub> controlled atmosphere allows exact pH adjustment of the cell culture medium. With a CO<sub>2</sub> range up to 20%, as well as options for cooling and controlled humidity, the «XC» incubator shakers can be tailored to meet all requirements.

#### Illumination unit for photosynthesis (LED) ②

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 maximum 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.

#### Touchscreen

This option includes a 9-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.

### 3 Pull-out table



#### Pull-out table 3

The pull-out table is designed for the ISF1-X and ISF4-X incubator shakers as well as the Rack System. This remarkable device makes loading and unloading trays much easier.

#### Dual table

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 F size tray. However, with the dual table the shaking speed is limited to a maximum of 200 rpm.

#### 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.

#### 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.

### 4 BPM-60



#### BPM-60 4

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

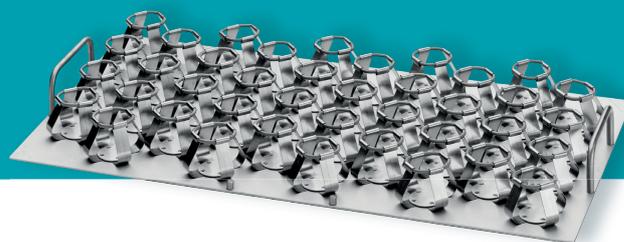
The TabCom option from Kuhner consists of a cable for power and data with the connection port integrated in the shaking table. A cable guide prevents the cable breaking and ensures secure data recording. Online measuring technologies offered by Kuhner that use TabCom include BPM-60 (pH, dissolved oxygen)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

#### 3mm / 1000rpm (on request)

Up to two shaking units (out of four) can run with shaking frequencies up to 1000 rpm at 3 mm shaking diameter. This combination is specifically recommended for users of 96 deep-well microtiter plates with high filling volumes (e.g., cell culture in deep-well plates). The shaking table is specially designed for up to 20 microtiter plates, and it is also suitable for the Duetz system. The option 3 mm/1000 rpm is only available for ISF4-X with active cooling. Existing ISF4-X incubator shakers can be retrofitted with this option.

## Clamps of different sizes

## 5 Tray F-250 with fixed clamps



## Accessories

To suit your application

### Universal tray FU

Order number: 102212

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.

### Clamps for Erlenmeyer flasks

Order number for 1 clamp	Flask size	Max. number of clamps per FU
101405	25 ml	113
101406	50 ml	100
101407	100 ml	72
101408	125 ml	50
101409	150 ml	50
101410	200 ml	44
101411	250 ml	40
101412	300 ml	37
101413	500 ml	27
101415	1000 ml	16
101416	1500 ml	12
101417	2000 ml	9
101418	3000 ml	8
101419	4000 ml	5
101420	5000 ml	4
101421	6000 ml	4
101424	2800 ml Fernbach	5
101425	5 L Thomson/ 3 L Corning Fernbach	5

### F-tray with fixed clamps 5

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.

Order number	Description	# 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
101569	F-3000 ml	8
101570	F-4000 ml	5
101571	F-5000 ml	4
101572	F-6000 ml	3

### 6 F-tray for microtiter plates



#### F-tray for microtiter plates 6

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
104900	F-MT.22	24 - 48
104894	F-MT.47	24 - 96
104898	F-MT.77	24 - 144

#### F-tray with sticky strips

Order number: 105200

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. Flasks of all sizes can be used. Sticky strips are available individually or in sets and can also be supplied already fitted to a tray. The F-size tray accepts eight strips.

#### F-tray for separating vessels

Kuhner has also designed a special tray for shaking separating vessels. This very flexible tray can take vessels of various sizes. It is also possible to add a second layer and double the capacity. Movable retaining rods allow vessels to be installed easily.

Order number	Description	# of vessels
on request	FS-250	10
on request	FS-250/2	20 (2 layers)
on request	FS-500	8
on request	FS-500/2	16 (2 layers)
on request	FS-1000	6
on request	FS-1000/2	12 (2 layers)

### 7 F-tray for centrifuge tubes



#### F-tray for centrifuge tubes 7

Order number: 102212 + 5x 100639

The use of centrifuge tubes (e.g. 50ml Falcon tubes and TPP 50ml tubes) in cell culture screening is well established. This F-tray has a capacity of 120 x 50ml centrifuge tubes (5 racks of 24).

HOLDERS for 600ml TPP tubes are also available.

#### F-tray with support bars

Order number: 106134

This tray offers an alternative to both clamps and sticky mats and is ideal for tall containers. The tray is covered with a rubber mat and has an upright at each corner. The F-tray is fitted with six cross supports to securely clamp containers.

#### F-tray with rubber mat

Order number: 105311

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

#### Shelf

Order number: 105591

The ISF4-X incubator shakers 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.

#### 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.



# Shakers & Accessories

[www.kuhner.com](http://www.kuhner.com)

# Kuhner

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